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The Sanitary News.

HEALTHY HOMES AND HEALTHY LIVING.

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A SEMI-MONTHLY

JOURNAL OF SANITARY SCIENCE.

G. P. BROWN, EDITOR.

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INDEX TO VOLUME I.

A.

Acids, effects of in sewerage ... 11
Adulteration of food, notes on subject ... 23
Air, foreign substances in the ... 20
fresh air and foul ... 8–10
in relation to health ... 20
American Public Health Association ... 38
Ancient wall hangings ... 129
Antiseptic action of disinfectants ... 17
Antiseptics, efficiency of vapors as ... 11
Apple jelly from rotten fruit ... 130
Apprentice law for plumbers ... 134
Appropriations for board of health of Chicago ... 121, 122
Arch and vault, origin of ... 82
Architects, responsibility of, for sanitary defects ... 69
Architecture as a part of general culture ... 26
improvement in ... 22
sanitary ... 7–8
Arsenical wall-papers, investigation of ... 15
Atmospheric currents in a room, illustration of ... 9
Avery, Dr. John, on popular errors about medicine 90, 102

B.

Bacteria, effects of quinine on ... 99
Baker, Dr. Henry B., on deaths from typhoid fever ... 10
Beef, Chicago dressed, quality of ... 33
Board of Health of Chicago, expenses of ... 121, 122
of Cincinnati ... 122
of trade building, Chicago ... 42
Bowditch on syphonage of traps ... 5–6
Bricklayers, strike by, in Chicago ... 135
Building in Chicago in 1882 ... 70
intelligence, 11–12, 24, 35, 48, 60, 72, 84, 95, 107, 120, 132, 143
permits issued in Chicago, 12, 24, 36, 48, 60, 72, 84, 95, 120, 132, 144
Buildings, plans of, must be submitted to Chicago health department ... 8
regulation of the construction of high ... 61
Burlington court house ... 128
Business notices ... 21

C.

Cane and straw furniture ... 129
Carbolic acid, virtues of ... 33
Carving ... 129
Causes of mortality in Chicago ... 85
Chandler, Prof. C. F., on the air in relation to health, 20
Chicago, mortality in ... 21
plumbing regulations in ... 10–11
sewerage—its inception ... 137
Child inenbation, artificial ... 47
Chimneys, draught of ... 82
Cholera, outbreak of near Dantzic ... 18
Cincinnati board of health ... 122
proposed administration of sanitary affairs in ... 128
Citizens' Association of Chicago, work of ... 2
Coal-gas, danger from escaping ... 13
Coal, use of in Chicago ... 14
Coffee, alleged adulteration of ... 87
College building, properly constructed ... 64
of physicians and surgeons, building of ... 64
Combustion and smoke prevention ... 41
Common defects in house drainage ... 65
Condition of the Cook county jail ... 85, 97
Consumption, is it contagious? ... 22
Schmidt on ... 39
Contagious diseases carried by rags ... 111
posting notices of ... 75
regulations concerning, in St Louis ... 39
Contagiousness of consumption ... 22
Contracts awarded ... 143
Cook county jail, repairing drains in ... 74
specifications of repairs at ... 104
Country, health in the ... 18
Cremation in Chicago ... 122
Current publications ... 59
71, 83, 94, 107, 119, 130, 143

D.

Damp walls, danger from ... 74
Dangers from damp walls ... 74
in dirt ... 113, 125
Dantzic, outbreak of cholera near ... 18
Dayton, Ohio, electric light at ... 99
Death-rate, as affected by surroundings ... 25
decrease in England ... 8
of Memphis ... 122, 123
of New York and London compared ... 16
Deaths from preventable diseases in Chicago ... 82
Decoration of house interiors ... 92
Defective drainage, action at law concerning ... 87
drains and sickness ... 26
house drainage ... 65
Delusions of disinfection ... 17
Deodorizers not disinfectants ... 17
De Wolf, Dr. O. C., on Chicago dressed beef ... 33
Difficulties in securing proper buildings ... 49
Diphtheria, how to deal with ... 46
in Virginia ... 11
prevention of ... 106
Dirt, dangers in ... 113, 125
Disease, filth as a cause of ... 34
Disinfectants ... 40
Disinfecting power of antiseptics ... 3
Disinfection, delusions of ... 17
Dixon, Judge, on criminal spread of infection ... 79
Drainage, rules of English office of public works on ... 22
and ventilation of Cook county jail ... 54
Draught of chimneys ... 82
Dress to prevent communicating disease by nurses ... 97

E.

Electricity and its uses ... 143
Electric lighting at Dayton, O ... 99
for cars ... 8, 11
notes on ... 23, 119, 131
Electric wires, laid under ground ... 97
Elevation, the improvement of climate with slight ... 22
Engineering, sanitary, Capt. Galton on ... 28
English plumbing and drainage ... 22
Expenses for health work in Chicago ... 121, 122
Explosion of water-backs, how to prevent them ... 86

F.

Farms, sanitary condition of ... 19
Filth as a cause of disease ... 34
mediæval ... 34
Fire-proof materials for buildings ... 61
Fires, facilities for extinguishing ... 20, 27
Floor and wall coverings ... 105
impervious to ground air ... 20
Flush-tank, William's automatic ... 32
Foreign substances in the air ... 20
Forests, destruction of ... 14
Food adulterations, notes on ... 23, 35, 48
Foul air and fresh air ... 8–10
Fresh air and foul air ... 8–10
entrance, proper place for ... 20
Furnaces without fresh air supply ... 98

G.

Galton, Capt. Douglas, on pure air, ... 25
on sanitary engineering ... 28
Garbage, disposal of ... 75
Gas, competition in the manufacture of ... 26–7
for nothing ... 101
lighting by compressed oil ... 38
meter inspection in New York ... 11
Prof. Siemens on the future of ... 29
regulator, automatic ... 11
works at Cincinnati ... 11
Gases, diffusion of ... 77
Genung, Mr., on tenement houses ... 69
Grand Rapids, placarding contagious diseases in ... 107
Ground air, Pettenkofer on ... 18

H.

Health administration in Chicago ... 134–5
as capital ... 39
in the country ... 18
Heating apparatus as source of air contamination ... 20
House-building, the art of ... 2
drainage ... 40
drainage as it is ... 76
88, 100, 112, 124, 136
drainage, common defects in ... 65
drainage, suits at law concerning defective ... 99
drainage, rules for ... 33–4
drainage, system in use in Blair Lodge ... 31
drains, the careless use of ... 26
interior, the ... 92
105, 118, 129, 142
renting agents and tenants ... 79
How to make a place unhealthy ... 89
Hydrogen Peroxide as an antiseptic ... 69
Hygiene, museum of, proposition to establish ... 3

I.

Illinois state board of health ... 50
on prevention of diphtheria ... 106
Illustrations:
Adee's trap ... 102
Antill's trap ... 101
Anti-syphonage Y branch, illustration of ... 5
Atmospheric currents in a room ... 9
Bell trap ... 93
Blair Lodge ... 30
Board of Trade, Chicago ... 43
Bottle trap ... 90
Bottle trap choked ... 115
Bower trap, ... 4, 112
Brandeis' Paragon trap, ... 4
Broken drains ... 88, 112
Buchau's traps ... 104
Church at Fargo, Dakota ... 66
City morgue in Chicago ... 116
College of Physicians and Surgeons ... 64
Cone of filtration ... 139
Cone of pollution ... 139
Cook county jail and criminal court building, drainage and ventilation of ... 54
Court house at Burlington, Iowa ... 127
Cudell's trap ... 93
Defects of construction ... 88
D-trap ... 116
Garland's trap, ... 4
House of Reuben Elwood ... 121
Imperfect joints ... 100
Leaking drain ... 65
Long hopper-closet ... 136
Materials used in house drainage ... 77
Mercury seal trap ... 5, 113
"Modern improvements," ... 76
Nicholson's mercury seal trap ... 5, 113
No sewer connection ... 100
Pan closet ... 101, 138
Paragon trap ... 4
Plunger closet ... 124
P-trap ... 89
Putty joints ... 65
Rats as sanitary inspectors ... 124
Round trap ... 88
Running trap ... 113
Ruttan system of ventilation ... 56, 57
School building at Evanston ... 109
at Almont, Mich ... 67
Seal of the Chicago Master Plumbers' Association ... 140
Short hopper-closet ... 137
Soil-pipe imperfectly ventilated ... 136
S-trap ... 4, 100
System of house drainage in use at Blair lodge ... 31
Traps, illustrations of ... 4, 5
Untrapped waste-pipe ... 100
Valve closet ... 125
Waring's cheek-valve ... 92
Wash-out closet ... 140
Williams' automatic flush-tank ... 32
Immigrants and small-pox ... 53
inspection of, and small-pox ... 97
inspection of ... 53
inspection service ... 27, 28
Improvement in architecture ... 22
Infection, the criminal spread of ... 79
Infiltration water supply system ... 133
Inspection of houses ... 98
Inspection of tenement houses ... 73
Interior, the house ... 92, 105, 118, 129, 142

J.

Jenney, W. L. B., architectural work by ... 13, 30
Jones, A. A., mention of ... 15

K.

Kedzie, Dr. R. C., on interest in sanitary matters ... 8
on relations of soil-water to health ... 138
Kellogg, Dr. J. H., on dangers in dirt ... 113, 125

L.

Larned, W. C. country residence of ... 30
Lease adopted by the real estate and renting agents ... 123, 128
Le Bon, experiments on disinfecting power of antiseptics ... 3
Lectures by the N. Y. Master Plumbers' Association ... 20
Legal action concerning defective drainage ... 87
Leprosy in Sandwich Islands ... 80
Library rooms at Pullman ... 59
Life in tenements ... 16

Lighting, notes on ... 23, 35, 47, 71
Linernsta Walton, for walls ... 106
London, inspection of houses in ... 98
Love, Geo. A., on placarding contagious diseases ... 107
Lowe, F. R. Eaton, on ventilation ... 8-10

M.

Malaria in Italy ... 35
  march of ... 10
Master-plumbers' association of Chicago ... 11
Medicine, popular errors about ... 90, 102
Memphis and its sewerage ... 122, 123
Michigan, health in ... 23, 46, 59, 119
  meeting of State board of health of ... 10
  sanitary work in ... 81
  state board of health, proceedings of ... 81
Milwaukee fire, the ... 61
Model office building ... 116
Morgue, a new ... 115
Mortality in Chicago ... 21
  causes of ... 85
  in October, 1882 ... 34
  in November, 1882 ... 70
  in town and country ... 69
Mouth, device for lighting the ... 62
Museum of hygiene, proposition to establish ... 3
Mutual Union Telegraph Co., wires cut by city authority ... 110

N.

New Orleans, sewerage of ... 141
Nostrums and the public health ... 68
Notes and news ... 23, 35, 47, 60, 71, 83, 94, 119, 131, 143

O.

Office building, a model ... 116
Overcrowding, causes of ... 73
  in tenements ... 16
Overwork and worry ... 130
Overworking young children ... 75

P.

Pasteur on vaccination of cattle and sheep ... 110
Patent medicines and the public health ... 68
  Prof. A. B. Prescott on ... 51
Pavement, the poorest and the best ... 22
Payne, Dr. J. T., on New Orleans sewerage ... 141
Permeability of walls ... 117
Pettenkofer on ground air ... 18
Philadelphia, ventilation of sewers in ... 3
Philbrick on siphonage of traps ... 5-6
Picture frames ... 129
Placarding contagious diseases ... 107
Plumber, unnecessary abuse of ... 15
  and his trade, elevation of ... 110
Plumbers and their apprentices ... 62
Plumbers' association of Chicago ... 59, 93, 119, 140
  bureau of exchange ... 110
  expression of rascally work ... 133
  how they may benefit themselves ... 50
  need of scientific training ... 110
  Potts and the ... 82
  progressive ... 82
  unjust charges against ... 50
Plumbing and drainage, notes on ... 23
  and illness ... 130
  defective, in Chicago ... 11
  essentials of good ... 20
  imperfect, and its result ... 130
  law in New York ... 62
  law, priority in ... 78
  laws, a plea for ... 130
  ordinance proposed in Philadelphia ... 85
  regulations in Chicago ... 10, 11
  rules of English office of public works on ... 22
Pneumatic sewerage at Lyons, France ... 27
Poor, New York association for improving condition of ... 16
Popular errors about medicine ... 90, 102
  opinion and sanitary improvement ... 67
Posting contagious diseases ... 107
Potatoes, new use for ... 87
Potts and the plumber ... 82
Prescott, Dr. A. B., on nostrums ... 68
Preventable diseases in Chicago, deaths from ... 82, 93
Prevention of diphtheria ... 106
Proposed electrical railway ... 75
Publications, notices of
  American Architect ... 83
  Builder ... 71
  Cameron's Plasterers' Manual ... 143
  Continent The ... 83, 94, 119
  Heating and Ventilation ... 130
  House and its Surroundings ... 71
  House Drainage and Sanitary Plumbing ... 83
  Inland Architect and Builder ... 130
  Modern Age ... 59, 83, 119
  Popular Science Monthly ... 71, 94, 107, 130
  Potable Water ... 91
  Sanitarian, The ... 59
  Science ... 107, 130
  Sewer-gas and Its Dangers ... 94
Publications received,
  ... 23, 60, 71, 84, 94, 107, 119, 130, 131, 143
Pullman, library rooms at ... 59
  sewerage at ... 6-7
Pure air and the public health ... 25

Q

Quarantine by Louisiana ... 135
Quinine, effects of, on bacteria ... 99

R

Rags, danger of contagion ... 111
Randall, G. P., designs by ... 66, 67, 79
  on Ruttan system of ventilation ... 56
Rauch, Dr. John H., on immigrant inspection service ... 27, 28
Regulating work of plumbers and drain layers ... 135
Relations of soil-water to health ... 138
Robinson Prof, H., on sanitary architecture ... 7-8
Rules for house-drainage ... 33-4
Ruttan system of ventilation ... 56

S

Saint Louis, Mo., water-supply of ... 11
Sandwich Islands, leprosy in ... 80
Sanitary advantages of high living ... 22
  affairs in Cincinnati ... 128
  architecture ... 7-8
  condition of Cook county jail ... 35, 38, 49, 54, 63
  condition of shops ... 37
  convention at Reed city, Mich ... 134
  council of the Mississippi Valley ... 110, 135
  engineering ... 28
  improvement and popular opinion ... 67
  inspection of houses ... 98, 141
  protective association, need for ... 74
  science, Prof. Kedzie, on benefits of ... 8
  surroundings as they affect the public health ... 25
Scarlet fever introduced by immigrants ... 97
Scientific ventilation ... 17
Seal of plumbers' association of Chicago ... 140
Seaside resorts, unsanitary features of ... 98
Separate systems of sewerage ... 101
Sewerage ... 48
  and death-rate of Memphis ... 122, 123
  at Pullman ... 6-7
  of Chicago ... 60, 135
    its inception ... 137
  of La Crosse, Wis ... 134
  of New Orleans ... 141
    objections to ... 111, 122
  separate systems of ... 101
  system for New Orleans ... 122
    objections to ... 111
Sewer-gas, how are we to avoid being poisoned by ... 44
  in Cook county building ... 3
  question, the ... 20
Sewer-pipe, mode of laying in Pullman ... 2
  mode of testing at Pullman ... 2
Sewers, ventilation of, through street-lamps ... 11
  Waring on ventilation of ... 3
Sickness in British troops at Cairo ... 39
Siemens, Prof., on electricity and gas ... 39
  prophecy of concerning fuel of the future ... 3
Siphonage of traps in Cook county building ... 3
  Waring, Philbrick and Bowditch on ... 4-6
Smallpox and immigrant inspection ... 97
  in Chicago ... 121
  in New Orleans ... 111
  statistics in Chicago ... 80
Smoke, facts about the effects of ... 64
Smoke ordinance, a test case under the ... 61
Smoke prevention and combustion ... 41
  at Elk Rapids ... 37
  first efforts for, in Chicago ... 14
  in America ... 11
  in Chicago ... 2, 135
Soil-water in its relations to health ... 138
Soothing-syrup, quantity sold in Chicago ... 3
Specifications for repairs to Cook county jail ... 104
Splenic fever prevented by vaccination ... 110
State medicine, lectures by Dr. DeWolf ... 51
Street dirt in Chicago ... 122
Streets, improvement of Chicago ... 70
  obstruction of ... 51
Systematic inspection of houses ... 98
Suits at law growing out of defective drainage ... 99

T.

Telegraph wires, underground ... 110
Temperature, high, as a disinfectant ... 17
Tenants and house-renting agents ... 79
Tenement houses, New York ... 93
  one year among ... 69
  inspection in Chicago ... 52, 63, 70, 81, 93
  inspection, obstacles to ... 98
  of America ... 52
  inspectors, work of, in Chicago ... 52, 63, 70, 81, 93
  life in ... 16
  overcrowding in ... 63
Terra-cotta lumber, process of manufacture ... 14
Testing of sewer-pipe at Pullman ... 2
Traps, Waring, Philbrick and Bowditch on siphonage of ... 4-6
Trinidad asphalt pavement ... 22
Typhoid fever caused by specifically-poisoned water ... 87

U.

Underground telegraphy ... 110
Undertakers, lectures to, at Chicago medical college ... 51
Unsanitary features of seaside resorts ... 98

V.

Vaccine virus, the propagation of ... 32
  use of on emigrant ships ... 27
Vaccination in preventing splenic fever ... 110
Vanderbilt's house, water-supply in ... 23
Vaughan, Dr. V. C., on sewer-gas ... 44
Vault and arch, origin of ... 82
Ventilation, an English plan for warming and ... 130
  and drainage of Cook county jail ... 54
  and the public health ... 25
  as affected by the permeability of walls ... 117
  of a hotel ... 17
  of Guildhall, London ... 38
  of houses ... 8-10
  of sewers, Waring on ... 3
  scientific ... 17
  the Ruttan system of ... 56
Vital statistics of Cook county, 1881 ... 47

W.

Wade, J. J., on house drainage ... 40
  on need for better plumbers ... 140
Wall decoration, English ... 69
Wall-paper, investigation for poisonous ... 15
  styles of ... 106
Walls, permeability of ... 117
Warfare that ends in extermination ... 46
Waring, Col. G. E., on Memphis sewerage and death rate ... 123
  on separate systems of sewerage ... 101
  on siphonage of traps ... 4-5
  on ventilation of sewers ... 3
Warming and ventilation, and English plan for ... 130
Waste, prompt removal of, necessary ... 2
Water-back explosions, how to prevent them ... 86
Water, damages awarded for drinking impure ... 11
  from wells in New York city, character of ... 14
  gas, manufacture of in Chicago ... 87
    the future of ... 75
  rates at New Brunswick, N. J. ... 11
  supply, notes on ... 23, 47, 60
    in Vanderbilt's house ... 23
    of St. Louis, Mo. ... 11
  waste ... 86
Western electric light company ... 21
Whooping-cough as a cause of death ... 11
Wight, Dr. O. W., on how to make a place unhealthy ... 89
  on pavements ... 22
Williams, Benezette, on Pullman sewerage ... 6-7
  Dr. N. H., experiments by, on effect of quinine on bacteria ... 99
Window decorations ... 129
Wood, preservation of ... 68

The Sanitary News.

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Vol. I. Chicago, November 1, 1882. No. 1.

CONTENTS.

INTRODUCTORY 1

CURRENT TOPICS:

- Present Sanitary Condition of Chicago 1
- House Building a Lost Art 2
- Results from Testing Drains 2
- Dangers of Putrefaction 2
- National Museum of Hygiene 3
- An Expert's Opinion of Sewer Ventilation 3
- Circumstances under which Traps are Useless 3
- Dangers in the Use of Soothing Syrup 3
- The Future of Gas as a Fuel 3

THE SIPHONAGE OF TRAPS 4

THE PULLMAN SEWERAGE 6

SANITARY ARCHITECTURE 7

INTEREST IN SANITARY MATTERS 8

FRESH AIR AND FOUL AIR 8

THE MARCH OF MALARIA 10

HEALTH IN MICHIGAN 10

PLUMBING IN CHICAGO 10

NOTES AND NEWS:

- Plumbing and Drainage 11
- Water Supply 11
- Lighting 11
- Miscellaneous 11

BUILDING INTELLIGENCE 12

THE SANITARY NEWS will be published on the 1st and 15th of every month. It will contain twelve pages, exclusive of advertisements, and be printed on the best calendered paper, original illustrations, executed by the best engravers, being used whenever they will aid in the explanation of any technical subject. The paper will be devoted to house-building — so far as the sanitary construction of a house is concerned — plumbing, lighting, heating, and ventilation; the sewerage of a town or city, and country drainage; water supply, food adulterations, etc. The latest intelligence relating to these and other sanitary matters will be furnished, and especial pains taken to secure accurate information. Complete lists of all new houses and other buildings which are to be occupied in part as residences, or for offices, both in Chicago and in other cities in the West, will be published. Plans themselves will be reproduced when especially note-worthy, as well as systems of drainage and ventilation. While scientific in nature, the paper will present all its matter in a readable form. No long-drawn-out dissertations on any topic will be admitted to its columns. The co-operation of competent writers has been secured, and, financially, sufficient encouragement to warrant its success. The West and, particularly, the great Northwest, with Chicago as its center and source of supply, furnishes a wide and productive field for a paper of this kind, even as it does for the business of those who are thriving in the particular lines which THE SANITARY NEWS proposes to represent and encourage. It will be a medium of communication between those who furnish supplies for the construction and equipment of a house, and those who need them. The size and general typographical appearance of the paper are sufficiently well indicated in the present number. The first and last pages will be at the disposal of advertisers, the rates and other information being given in another column.

THE SANITARY NEWS begins its career with a large number of paid subscribers, and an effort will be made to place the first number in the hands of as many others as possible, who are believed to be interested in its matter and its work. If those who receive it will take occasion to speak as favorably of it as it deserves to those who are yet strangers to it; and if all will at once forward their orders for subscriptions, they will aid in making the paper prosperous and the work successful. Sanitary topics are apt to be considered "dry," but this is a great mistake; there can be nothing more interesting, to say nothing of its profitableness, than the information which helps one to preserve the elasticity and vitality of youth, and so happiness and good looks; which teaches how to have a house built which shall be free from dampness and ground-air, sewer-gas and vitiated atmosphere; which indicates how streets may be kept clean, and the yards about country residences well drained, and which shows what one may eat, drink or wear with the greatest degree of safety, comfort and enjoyment. Success in business depends upon good health; so does one's capacity for enjoyment. Good health is maintained only by correct living, and the thousand and one things that a man may do to live aright, physically, it is the province of a sanitary paper to point out and discuss. With such a mission, THE SANITARY NEWS enters the field of journalism, expecting to do a work somewhat different from that of any other journal—to popularise what is beginning to be so much talked about, sanitary science. Its pages will be open for free and intelligent discussion, and, indeed, information is solicited from those who may have something new to say.

THE Citizen's Association has made it a matter of first importance to see that the sanitary condition of this city is improved. In its annual report, just completed, it calls attention to the fact that Chicago has been the first city on this continent to adopt a smoke ordinance. As to what has been accomplished under it, the report says that all doubt as to the feasibility of reducing smoke in stationary engines has been dispelled. Some of the railway companies are making arrangements to put their locomotives outside the ban of the ordinance, and it is believed that the movement will be followed very closely by the tugs and other steam vessels. The city has been annoyed by stenches, but less than in former years, the offenses of the rendering establishments having been promptly suppressed. The worst stenches have come from brick-making from offensive material dredged from the river, and from the river itself. It is expected that the completion and operation of the Bridgeport pumping-works will afford permanent relief from the river odors. Street cleaning has been done with much greater care than in former years. The practice of throwing garbage into the street is deprecated, and the appointment of special policemen to prevent it suggested. Gratifying improvements in street pavements have been made, and the time is thought to be at hand when paving with wooden blocks will have to be abandoned in the business portion of the city and something as substantial as blockstone substituted. It is considered that a good, permanent pavement can be maintained on no other plan than for the city to care for it, after the streets have been improved on a plan adopted by the city, at the cost of the property. The Health Department is complimented for its rigid enforcement of the new law relating to house drainage, and, it is added, so much progress has been made within a few years in the knowledge of sanitation, especially with regard to house drainage and sewer-gas, that it leads to the hope that the present disease rate will materially decrease.

THE *London Saturday Review* thinks that English-speaking people have lost the art of house-building. This is particularly true, it claims, of the Americans, who have, in their boarding-house existence, departed further than any other people from the ideal of home life. We can build depots, warehouses and hotels—mere transit-places, neither homes nor places of business—but nothing else. Our so-called homes are lath-and-plaster band-boxes, in which, as Ruskin says, a man, rather than wish to live, ought to choose to raise for himself a log-hut. This peculiarity seems to characterize more or less all modern civilization. The Latin races are taking more and more to the barrack-like form of house which is called "flats." The Germans, in all large towns, are following this example. It might appear that the nations called civilized were on the eve of returning again to the nomadic phase of existence, since a national art of house-building seems to characterize all people who have left nomadism behind them. As soon as man realizes that he has a permanent place in this world he invents for himself some form of house architecture. This was done by our Aryan ancestors so soon as they had brought their nomadic life to an end, and a germ of the art they handed down to all their descendants. It is a fact that in a very remote prehistoric past we can distinguish among most of the people of Europe some quite developed notions with regard to house-building, and that some of these prehistoric houses have been preserved almost to our own day. Aside from the ruinous expense of living in other people's houses, we ought, as individuals, to have our own homes. The poor man in his humble cottage, comfortable but homely furnished, is happier and more prosperous than his neighbor fellow-laborer, who has better rooms in a house already occupied by other families than his own, oppressed with a sense of uncertainty as to the tenure of his lease, and reckless as to the care of the premises. In consenting to "board" and live in apartments, the American people are drifting toward barbarism, and increased domestic unhappiness, due largely to this continual shifting about, is one of the indications of it.

SOME interesting facts were brought to light in the construction of the Pullman sewerage, with reference to the best means of inspecting and testing pipes. Before laying the pipes it was thought best to make a test as to whether weak or cracked pipe could be detected by ordinary inspection. An application of hydraulic pressure developed the fact that no inspection possible to apply could be relied upon. Many pipes that looked rough and full of fire cracks, that would ordinarily have been rejected, were found to be among the best, while, on the other hand, the clearest-ringing and best-appearing pipes were often the poorest. These results made it necessary to apply the test generally. The test applied was 20 pounds pressure per square inch. It was soon found that this pressure would break too large a proportion—about two-fifths—of the 18-inch pipe, so it was decided to lay the main in concrete without testing. The 9-inch pipes stood the test better, about one pipe in four being broken in the operation. This loss could be stood and still the sewer pipe be much the cheapest thing that could be used for the purpose. It was a noticeable peculiarity of the pipes that 75 per cent. of those that failed, broke below 10 pounds. The bed of concrete around the 18-inch main was from 4 to 6 inches in thickness, the bottom generally made of Utica cement, mortar, and broken stone, while for the top and sides Portland cement was used. The 9-inch pipes were laid with stiff Portland cement, mortar mixed with an equal quantity of sand. A hemp gasket was tried at first, but it was soon found that the quickest and best way in every respect to make a joint, was to form a bed of mortar on the lower half of the socket and insert the next pipe, then with the trowel to apply the mortar to the annular space on the top, until it was forced through to the inside. Out of 7,500 feet of pipe laid in this manner there has been found but one case of defective joints, and this was caused by a heavy rain during the laying. The general conclusion from this experience thus far, in the use of clay sewer pipes, to carry fluids under pressure, is that for light pressure of about 10 pounds, the smaller pipes are well adapted to the purpose, if proper care is used in selecting them and in making the joints as they are laid. Thin pipe seemed to give better results than thick ones.

THE necessity of a prompt removal of waste, liquid and solid, from a house and out of a city, if the ill effects of

its decomposition would be avoided, is clearly shown in some recent experiments which have been performed by M. Le Bon, of Paris. He has shown that the effect of antiseptics diminishes as putrefaction advances, while the disinfecting action of most substances bears no relation to their effect in destroying microscopic organisms. Again, the character of the noxious products of putrefaction has been found to change materially as decomposition advances. The poisonous quality appears to be contained at first in the non volatile products, but makes its appearance later and with peculiar virulence, in the volatile compounds. To show this, frogs were confined in an inclosure with a small quantity of a liquid obtained by macerating chopped meat in water. The liquid soon became very offensive and so poisonous as to cause death if injected under the skin of an animal; but the frog which merely breathed the effluvium was not injured. After two months of fermentation the liquid lost its septic effect on the blood, and could be injected into the circulation without injury, but its vapor became excessively poisonous, and the animals which inhaled it died. This, it was held, explains the unwholesomeness of the air of cemeteries, which is established by evidence, but has not heretofore been thought to be sufficiently accounted for as a scientific phenomenon.

The American Public Health Association, at its recent meeting at Indianapolis, indorsed the proposition of the Surgeon-General of the Navy, to establish at Washington a national museum of hygiene, which shall exhibit the history and progress of sanitary science by a collection of publications, articles, models, drawings, etc., illustrating defects and improvements in foods, water supply, bedding, clothing, marine architecture, house and hospital construction and furniture, apparatus for heating, illumination, ventilation, and removal of excreta and refuse, culinary and laundry facilities, for physical culture and exercise, and whatever else tends to the preservation of health and the prevention of disease. Four thousand volumes have been already accumulated, the intention being to make the collection of hygienic authorities as extensive as possible. An important adjunct of the museum, already in operation, is its experimental physiological laboratory, for the investigation and demonstration of biological phenomena, in which apparatus to the value of over $2,000 has been purchased. Analyses of foods, the study of the microscopic organisms of the atmosphere, and the examination of the ground-air at various depths, are among the investigations now being conducted at the laboratory.

In answer to a question, recently, when before a committee of the City Council of Philadelphia, Col. Waring said, with reference to the ventilation of the sewers: "I would use neither street openings nor tubes. Each householder should be required to run the drain pipe, which carries the sewage from his house, up to the roof. It should be left untrapped, and then every discharge of sewage all through the city would be followed by a draft of fresh air. With such sewers as yours the impregnation of the soil by noxious gases is much to be feared. It would cost little more to make them fit to do the duty for which they are designed. They should be cemented inside and out, the joints tightly closed and the material of the best, and they should be kept clean. But defective house drainage exerts influences as baleful as do the most wretched sewers. The greater number of the cases which doctors attribute to sewer-gas is due to fault, not in the sewers themselves, but to the filthy pipes which carry off the house drainage. Illuminating gas very often escapes from the pipes into the sewers, and most of the explosions are apparently due to that cause."

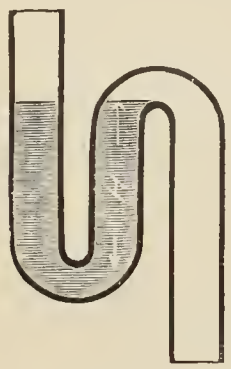
Considerable complaint has recently come from the juries in Judge Gardner's court in the North Side county building, in this city, on account of the obnoxious odors which pervade the atmosphere of their consultation room. The judge himself, and others employed in the court room, have been not only annoyed but sensibly affected by the atmospheric impurities. Complaint was made at the Health Department and Inspector Genung made an investigation. He found the drainage in good mechanical condition, but some tests proved clearly that the traps in the waste-pipes of fixtures in the jury room, were completely siphoned whenever the water was discharged from a water-closet in an adjoining room. These pipes connected directly with the soil-pipe into which the water-closet emptied, about four feet from the latter. This left an open communication from the jury-room to the street sewer, as there was no trap in the soil-pipe below the water-closet, nor in the main drain. In short, the street sewer was being almost constantly ventilated into the jury-room, and through it into the court-room itself. The soil-pipe is four inches in diameter and the waste-pipes an inch and a half. Common S traps are used. These results are of interest in connection with the experiments of Col. Waring and Mr. Philbrick, an account of which is given elsewhere in this number of the Sanitary News.

It is stated that 150,000 bottles of soothing syrup of all kinds are sold at wholesale in Chicago every year. Of this amount it is estimated that 100,000 bottles are consumed in Cook county, an allowance of five bottles for each baby. When it is considered that the principal ingredient of all soothing syrups is opium, which "inspires disgust for food, augments thirst, and embarrasses, or suspends altogether, the digestive process," the excessive suffering and mortality among children should not be wondered at. The Chicago Academy of Homœopathic Physicians and Surgeons has called the attention of the State Board of Health to this matter and urged it to cause the State Legislature to pass a law that every druggist or vendor of medicines or drugs for domestic use, which are known or believed to contain opium, shall label each bottle sold: "This bottle contains opium and is dangerous."

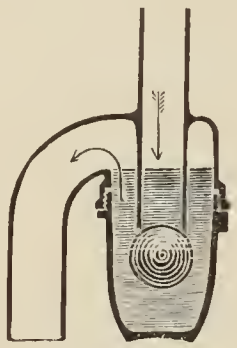
Prof. Siemens, in his address as president before the British Association at Southampton, prophesied that before many years have elapsed we shall find in our factories and on board our ships engines with a fuel consumption not exceeding one pound of coal per effective horse-power per hour, in which the gas-producer takes the place of the somewhat complex and dangerous steam-boiler.

THE SIPHONAGE OF TRAPS.

Between June 6 and December 22, 1881, George E. Waring, Jr., carried on a series of experiments on the siphonage of traps for the benefit of the National Board of Health. His report was put in type, but it was not then published because the results shown and the deductions drawn were not in accordance with prevailing theories. There is no reason to doubt, however, that Col. Waring's experiments were faithfully made, hence the facts developed should receive attention. Without describing the apparatus used, in detail, it may be stated that the trap to be tested was placed at the end of a 1¼-inch horizontal waste-pipe emptying into a soil-pipe near its base, through a 4 by 2-inch Y branch. This waste-pipe was provided with vents, which were alternately opened and closed. Above the waste-pipe and discharging into the soil-pipe on either side were a bath-tub and a water-closet. The soil-pipe, 4 inches in diameter, was extended upward several feet, and at the top was placed a flap-valve, which was closed in certain of the experiments. Different traps were tested, being placed at the end of the waste-pipe during the experiments. First, the bath-tub was entirely filled, and its contents, only, discharged by opening the 2-inch valve. Then the water-closet bowl was filled and the water in it discharged. Finally, both were filled and discharged together. The result in all three cases, when the soil-pipe was closed at the top and no vent in the waste-pipe open, was as follows: All the traps experimented with were completely siphoned—all the water was drawn from the S trap;



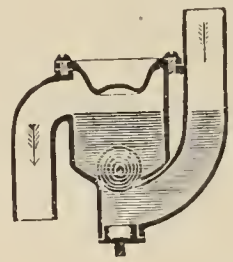
S TRAP.



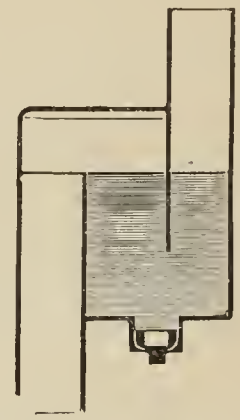
BOWER'S TRAP.

the water in Bower's trap was lowered about $\frac{7}{16}$ of an inch below the mouth of the inlet-pipe, allowing the top of the india-rubber ball to drop below this inlet–pipe; all the water was drawn from Garland's trap, from Brandeis' "Paragon" trap, and from Nicholson's "Mercury Seal" trap. In the last trap the mercury remained untouched, and the porcelain cup dropped into place, thus forming a seal. In Garland's trap the metal ball dropped back into its seat, thus forming a seal depending upon the accuracy of its fit. With the vents open, one after another, and the bath-tub emptying alone, the S trap lost from ½ of an inch to 1 inch of its water (the water seal was 3 inches deep). If no vents were open, and the valve on the top of the soil-pipe more or less open, the S trap lost from ⅛ of an inch to 1 inch of water. If the valve on the top of the soil-pipe was entirely open, Bower's and Garland's traps lost no water, and no motion of the balls was perceptible. If the bath-tub and the water-closet were discharged together, the result was that more water was lost from the S trap, but the seal was not broken. As in the other case, if the valve on the top of the soil-pipe was entirely open, Bower's and Garland's traps lost no water. The other traps were not tested. With the soil-pipe open at the top, and the vents opened successively, if either the bath-tub alone or the bath-tub and the water-closet were discharged together, the S trap lost no water at all. Bower's and Garland's traps showed no motion of the water or ball.

The soil-pipe was extended some fifty feet and the experiments repeated. The results were that the traps lost more of their water, but were not siphoned. Mott's "anti-siphoning" Y branch was inserted in place of the common Y branch at the junction of the waste-pipe and soil-pipe, and the result, with the soil-pipe closed (not extended), and no vent open, with the bath-tub emptying alone, was that the water from the S trap was completely siphoned; Garland's and the "Paragon" were completely siphoned. In



GARLAND'S TRAP.



BRANDEIS' "PARAGON" TRAP.

Bower's trap the water fell ½ an inch below the bottom of the inlet-pipe; the india-rubber ball dropped, unsealing the mouth of the inlet-pipe. These experiments sufficiently indicate the results under the other conditions.

An arrangement was also adopted to test the siphonage of traps under wash-bowls, or sinks, by a flow from another fixture, the waste of which joins that of the wash-bowl.

The most frequent case, that of a bath-tub and a wash-bowl on the same line of waste, was taken. The waste-pipe was 1½ inches in diameter. This case was selected as it seemed likely that the ventilation of the main soil-pipe by full-size extension at the top would not reduce the siphoning action of the flow from the bath-tub, if this flow should be sufficient to fill the section of the waste-pipe to a point past the junction of the wash-bowl waste. The experiments demonstrated the truth of the supposition. There was no perceptible difference in the siphonage of any of the traps tested, whether the top of the soil-pipe was open or closed.

Col. Waring says that the accuracy of his experiments is beyond question. He accounts for the commonly accepted theory, which his results do not sustain, on the supposition that experiments have usually been performed with small glass pipes, flushed by volumes of water relatively much greater than the soil-pipe of a house is ever called upon to carry. He says there is no doubt that if his trials had been made with a sufficient discharge of water to fill the soil-pipe nearly or quite full, the result would have been the same as that of trials with small pipes; but this cannot occur in practice. He used a bath-tub containing about 80 gallons, with a 2-inch outlet, unobstructed by a strainer, the tub being emptied in one minute and twenty seconds. With a water-closet discharging its full contents, and often a large bucket of water in addition, all in one body, he

secured a volume of flow past the branch on which the traps were placed greater than can occur in ordinary practice. He concludes that the following deductions are justified:

1. The flow of drainage through a 4-inch vertical soil-pipe, not ventilated at the top, produces a very strong suction on branch pipes, the mouths of which it passes.

2. The opening of the 4-inch soil-pipe at the top practically prevents such suction even when the upper part of the pipe is 70 feet in length and circuitous in its course.

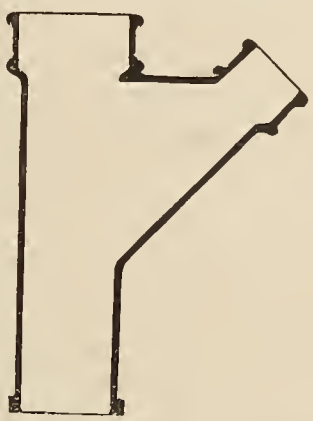
3. If each bath-tub, wash-basin, sink, etc., wastes by an independent outlet to a branch of a 4-inch soil-pipe open at the top, the siphoning of even ordinary S traps having more than one inch of seal is not to be apprehended.

4. If one vessel discharges into a branch leading from another vessel, the discharge of the latter may produce a suction on the S trap of the former sufficient nearly, or quite, to break its seal, unless of unusual depth.

5. When the conditions are the same as in the last instance, the suction is not sufficient to cause the ball of Bower's trap to drop away from its bearing, nor is it sufficient entirely to remove the water from traps which, like Garland's and Cudell's, are closed by a valve bearing vertically downward upon its seal.

6. Brandeis' "Paragon" trap showed no material superiority over the S trap. The water, under strong suction, was entirely removed from Nicholson's trap, but its mercury was not, and evidently could not be disturbed.

NICHOLSON'S MERCURY SEAL TRAP.



"ANTI-SIPHONAGE" Y BRANCH.

7. Mott's "Anti-siphoning" Y branch of the soil-pipe possesses no material advantage over the ordinary Y branch.

The general conclusion, he adds, which naturally follows these deductions would be that the separate ventilation of traps, where the main soil-pipe is four inches in diameter and open at the top, is unnecessary, especially as it is generally simpler and much less expensive to carry each waste independently to a branch of the soil-pipe.

A series of experiments conducted by E. S. Philbrick and E. W. Bowditch, also at the request of the National Board of Health, leads them to conclusions which are considerably at variance with those of Col. Waring. To test the effect on traps by the flow past them from above through the main into which they discharge, experiments were performed with a 2-inch waste-pipe open at the top. When the water was discharged from a bath-tub above the trap to be tested, the seal in the latter was lost twice out of five times, and the water was lowered in the other three experiments so that the seal had a depth of only $\frac{1}{8}$ of an inch. With a vent-hole one inch in diameter at the crown of the trap, there was no perceptible loss of water. The Cudell trap lost its water each time, and once the seal in Bower's trap was left only $\frac{1}{16}$ of an inch in depth and air was readily sucked up through the trap. When the water in the bath-tub, water-closet and hopper, all on the third floor, or any two of them, were discharged at once, the seal of a four inch S trap under a water-closet on the second floor, was lost every time. With a vent-hole 1½ inches in diameter in the latter trap, there was only a slight loss of water. With the soil-pipe closed at the top, and the vent open, there was not much difference in the result. A Bower's trap, under similar circumstances, with no air-vent, lost its seal four times out of ten when the water-closet above was discharged while the bath-waste was running. Nine times out of ten the water was all taken out of Cudell's trap.

To test the driving power of water through traps, and its suction after passing through them, apparatus was used similar to that in the former experiments. An S trap on a 2-inch waste-pipe was found to lose its seal completely every time a two-gallon pail was emptied into the hopper attached to it, notwithstanding the waste-pipe was extended full size to the roof and was open. The seal was lost only twice in nine experiments when the trap itself was ventilated at the crown by a lead pipe one inch in diameter and twenty-eight feet long. But the manner in which the water was poured in affected the result materially; less water was lost if it hit on one side of the hopper and whirled about during its downward flow, than if it was poured in directly toward the center without such spiral motion. When the vent-pipe was enlarged to a diameter of 1½ inches, the seal was not lost. When an ordinary wash-bowl, having an outlet of 1¼ inches in diameter and a bar strainer, was placed over the same trap, no water was lost in the trap, even when the vent-pipe was closed.

Experiments were then performed with a 4-inch waste-pipe, or soil-pipe, open at the top. A conical hopper was placed on the third floor on a 4-inch S trap having a water seal of 1⅞ inches, with a branch twenty-two feet long between the trap and the Y branch on the main. The seal was lost three times out of five when pailfuls of water were poured into the hopper. A vent-pipe was then attached to the pipe six inches below the crown of the trap and then at the crown of the trap. The seal was lost in both instances until the vent-pipe was enlarged to three inches in diameter. When the vent was in the crown of the trap, the water was seen to dash up into the vent-pipe and spill over the top of it, even when one inch long and three inches in diameter. When it receded a portion of this water dropped back into the trap and just sufficed to keep its seal when the vent was three inches in diameter. The loss of water was plainly attributable to the momentum of the stream when passing through the trap quite as much as to the air draught. This was shown by the direction in which the water was poured into the hopper. The effect of excessive length of vent-pipes was experimented on with the result that under conditions which indicated perfect security with a pipe one inch long and 1½ inches in diameter on a 4-inch trap, a coil of pipe fifty feet long coupled to the vent rendered it inefficient once in eight trials. It was found that it was much more difficult to retain water in the traps when the top of the soil-pipe was partially closed.

These gentlemen conclude that when hopper water-closets are used for the emptying of slops, and when the trap is placed below the floor, it is difficult to preserve the seal in the ordinary form of S trap, even by a vent-pipe attached thereto, unless it be applied directly at the crown of the trap and be as large as four inches in diameter for at least a foot above the trap. The momentum of the falling water helps the air draught to do the mischief. An abrupt change of direction may impair this momentum, but since it is manifestly useless to try to control the direction in which the water is emptied into the hopper, an endeavor should be mde to check it by the form of the apparatus. When a short hopper is used for emptying slops, with a trap above the floor, there is still no security for keeping the water in such a trap unless supplied by a special air-vent. This should be at least 1½ inches in diameter if more than a few feet in length, and even larger if passing to other floors above. The proper size and length of vent-pipes must be largely a matter of judgment.

Whenever branch inlets are connected to a line of waste or soil-pipe that is vertical, or approaching that direction, above which branches other fixtures are used for discharging water into the same main, the conclusion is reached that there is great risk of losing the water from the traps attached to such branches whenever the upper fixtures are used. They know of no form of trap without special air-vent which is not likely to lose its water seal under such circumstances, even when the top of the soil-pipe, or waste-pipe, is open, except those which, like the "round" trap are objectionable for retaining filth. The best and most simple remedy, in their opinion, for the siphoning of traps is found in the introduction of air at the normal pressure at the crown of the trap. The vent-pipe should be of the size of the trap it is to serve, unless it be more than two inches in diameter.

The reports made by these gentlemen have been published in *The American Architect and Building News* in full.

THE PULLMAN SEWERAGE.

Pullman, the latest and most promising suburb of Chicago, is a model town in a sanitary sense. It is worthy of attention in any of its numerous characteristics, but the fact that it was built to become the chief abiding-place of health and comfort is apt to be overlooked. The sewerage of the town is the result of design and not of accident or circumstances, and the curse which attends the disposal of sewage in most other towns and cities is not known there. It is now demonstrated that the waste of houses need not be even an offense. Pullman is located 14 miles south of Chicago, and although only two years old, it contains a population of about 6,000. About 1,500 houses have been built, or are in process of construction. All the building are of brick and constructed in as substantial a manner as possible. The plan of sewerage was determined upon, and the laying of sewers begun in the fall of 1880, under the supervision of Benezette Williams, engineer of the water and sewerage works for Pullman. Mr. Williams gave a detailed account of this system and its workings before the Society of Civil Engineers in Chicago, recently, and the facts in this account are taken from his paper.

The system of sewerage is designed to reach a tract of land comprising about 1,500 acres of land. To drain this district three mains have been provided, which center at the water tower, which is also the sewage pumping station. Two of the mains are 18 inches in diameter and one 15 inches. These mains are laid with a grade of one foot in 1,000 feet. The 9-inch laterals are laid with grades varying from 3 to 4 feet per 1,000 feet, and the 6-inch laterals with grades of from 4 to 6 feet per 1,000 feet, according to circumstances. The minimum grades used are sufficient to give a velocity of 2 feet per second. At the pumping station the mains are about 16 feet below the general grade of the town, the extreme ends of the 6-inch sewers in the alleys being about 6½ feet below the yards in the rear of the houses. The ground in which the sewers are laid is a hard, tough, drift clay. Man-holes are 160 feet apart on the mains and generally 200 feet apart on all the laterals. They are covered with a ventilating iron cover, with a trough or channel under the openings to catch dirt. The man-holes were put closer on the mains than on the laterals in order that a scraper might be used to remove deposit which it was feared would accumulate, owing to their slight inclination. In the smaller sewers. flushing and the pill are relied upon. In one instance only has it been found necessary to use a scraper. This was caused by a heavy rain which washed dirt into the sewer during construction. The flushing appliances consist in connections of the water mains with the 9, 12, 15 and 18-inch sewers, and of automatic flushing basins on the house drains, which flush the 6-inch laterals. The house drains from the sewers to the flushing basins are 6 inches in diameter. The horizontal pipes connecting the water-closets are 4 inches in diameter and are connected outside of the basins. The sewage from sinks and wash-bowls is usually carried outside of the houses separate from water-closet sewage, the former being admitted to the flushing basins and used for flushing. These basins serve the purpose of grease traps, in preventing the accumulation of grease in the sewers outside of the basins. The siphons are so constructed that the grease and other scum is carried out of the basin when a flush occurs. The grease being cold and carried along with a strong current it cannot adhere to the sides of the sewers. When the basins are properly built all the grease can be kept out of the basins by this means. The houses being of one ownership and management, from four to six houses are connected with one basin for the sake of economy. Another very effective method of flushing the mains, though not originally suggested as such, is by closing a valve in the pipe connecting the sewers with the sewage reservoir at the pumping station, until sewage has accumulated in the mains to as great a height as admissible, when by suddenly opening it, excellent results are obtained. In all there was laid at Pullman up to June 1, 1882, 24,312 lineal feet, which, with 130 man-holes, cost about $50,000. In all cases outside of houses, in mains, laterals and house drains, salt-glazed, vitrified clay pipe of the Akron make have been used. Within the houses, soil-pipes are of iron. The vertical soil-pipes are wrought-iron, coated with coal-tar varnish, put together with screw joints; and the horizontal pipes are cast-iron, with lead joints. The vertical pipes are 3 inches in diameter, and the horizontal pipes are 4 inches in diameter. The horizontal pipe

connects with the outside sewer, without a trap. The vertical pipe runs through the roof, in all cases full size. In most cases, each soil-pipe has two or more water-closets connected with it. A pipe placed in a partition wall between two houses generally takes the soil for both houses. In the case of three-story flats, one pipe frequently has six closets connected to it. By these departures from the usual size of pipes and the usual manner of setting closets, a great saving in cost has been effected without inconvenience of any kind. Out of several hundred 3-inch soil-pipes that have been in use from two to eight months, perhaps six or eight cases of stoppage have occurred. In every instance the stoppage was due to obstructions that got in during construction, and never to the use of a small-sized pipe. The results would unquestionably have been the same had 4-inch pipes been in use.

The sewerage system drains into a sewage reservoir in the base of the water tower, the whole width of the foundation of the tower having been excavated to a depth of 30 feet and all the space up to the grade of the sewers, not occupied by the walls being used for storage. This holds about 200,000 gallons. Increased storage capacity can be had when needed by excavating a side chamber. It is expected that the present capacity will suffice for 8,000 population. Ventilation of the sewage reservoir is secured by means of eight flues lined with 12-inch sewer pipe, built in the buttresses of the tower and opening at a height of 165 feet, and also by a 20-inch pipe leading to the chimney of the car-shops. The ventilation thus secured is perfect. The reservoir is arched over with groined arches, forming a floor for the sewage and water pumps, 10 feet below the surface of the ground. The sewage pumping engines are direct-acting, compound-condensing, with piston pumps, each having a capacity of 2,500,000 gallons in 24 hours. They were made with the special object of getting machines which would pump everything to be found in sewage either of an ordinary or an extraordinary character. It was considered desirable to avoid screening or settling the sewage at the pumping station. All the sediment which collects in the reservoir by incidental settling, is from time to time washed loose with a hose and passed off with the liquid sewage. The sewage is conveyed to a sewage farm, where it is used for fertilizing purposes, by a 20-inch cast iron main, nearly three miles long. The farm end of this main connects with a closed screening tank, by means of which all material that will not pass through a screen of ½-inch mesh is intercepted. The tank is 6 feet in diameter and 24 feet long, made of ¼-inch boiler iron. It is set vertically, with its lower end high enough above the floor to admit of a wagon being driven under it. The material intercepted by the screen is lodged in the lower part of the tank, from which it is removed from time to time. On leaving the tank the sewage passes through a pressure-regulating valve, which limits the pressure that comes upon the pipes leading to the fields to about 10 pounds. As an additional precaution against high pressure an overflow pipe is provided, which will absolutely, under all conditions, prevent the pressure from rising above the limit. This pipe comes into play occasionally when the pumps are started suddenly without giving the valve time to act. The valve is purposely made to act slowly, in order to avoid the influence of pulsations in the engines, and irregularities from other causes. The upper part of the tank above the screen is an air chamber, and answers the usual purpose of such an adjunct in preventing shocks from irregularities in the pumps, or by the sudden stopping of the flow of sewage.

The main distributing pipe is 18 inches in diameter. From this main four lines of 9-inch pipes, 315 feet apart, are laid across a 60-acre field. Every 350 feet on each line of 9-inch pipe a hydrant is set, thus giving one hydrant to eaeh 2⅓ acres or thereabouts. The pumps, screening tank and pressure-regulating valve are so arranged and are so dependent one upon another that notwithstanding the use of clay pipes for distributing the sewage the workmen on the farm can control the quantity of sewage received with perfect safety. They can close and open hydrants to any desired extent and vary the amount of sewage discharged almost as they please without danger or inconvenience. The operation is this: If the sewage is flowing at any given rate and one or more outlets be closed the eflect is partially to close the pressure-regulating valve in the tank, by a slightly increased pressure on the distributing pipes, and to transmit from the valve through the force main an increased pressure to the pumps, which are provided with a steam regulator that reduces the pressure of steam admitted to the cylinders. In order to avoid all possibility of injury to the pipes or pumps in this operation, a stand-pipe with two overflows is provided at the pumps, as well as one at the regulating valve, so that there is an absolute guarantee against damage from the failure of any mechanical appliances. The stand-pipe connected with the pump main in the tower is—measuring from datum—54 feet high to the first overflow, and 90 feet to the second overflow. These overflows are connected with a pipe which returns the sewage to the reservoir below the pumps. So that if every outlet is closed at the farm the pumps could continue to run with freedom. Should the regulating valve fail to perform its functions, the overflow pipe will protect the distributing pipes from undue pressure.

SANITARY ARCHITECTURE.

At a late meeting of the Sanitary Institute of Great Britain, Prof. H. Robinson, M. I. C. E., delivered an address dealing with many important points of sanitary engineering and architecture. He argued that the sanitary arrangement of a house should be the first care of the architect. He said: "It is no exaggeration to state that not one-quarter of the dwellings of all classes, high or low, rich or poor, are free from dangers to health due to defects with respect to drainage, water, or ventilation, which were capable of being easily avoided at the outset. The existence of sanitary defects is not always revealed by the results which attract such serious attention as to insure rectification, as is the case when illness breaks out, of a character clearly attributable to bad drainage, or water supply. Nevertheless, these original defects will inevitably entail a loss of health and energy to the occupants of the houses, and this may go on for years, working insidiously, but with deadly effect. The public are more alive than they were to the necessity for inquiring into these matters, and consequently sanitary

authorities are better able to enforce regulations, and are more willing to bear the expense of doing so. To insure healthy homes, local authorities should have by-laws requiring compliance with general rules, the principles of which are now well known, and hardly require to be specified." He insisted that in the case of a zymotic disease arising from sewer-gas, infected water, or other causes, the medical man should be required to give notice to the authorities, together with particulars of the house in which it occurred. He held that the house should be marked on the official map, so as to guide the officers to the unsanitary spot, and to show intending tenants, or purchasers, the character of the neighborhood. This plan, too, would serve as a safeguard against "jerry-building." He also urged that an inquest should be held in every fatal case of typhoid, typhus, or enteric fever arising from preventable causes. He spoke of the evils due to bad plumbing, and said that upon the efficient manner in which this was done depended the healthfulness of the house. He insisted that all new houses, before being let, should be certified by the local authorities as sanitarily complete.

It is generally supposed that the English people are in advance of us in sanitary matters, but we are apparently leading them, so far as the law has to do with the proper construction of a house. If new houses are not certified by the authorities as sanitarily complete, before they can be let, in Chicago there is a law requiring that all plans of buildings, which are to be inhabited wholly or in part, shall be submitted to the health department and passed upon by the commissioner before the building can be erected. The following are some of the things which that officer must know are sanitarily satisfactory before a brick can be laid: Location, size of lot, size of building, number of stories, how the basement is to be occupied, the number of families to be domiciled on each floor, height of ceilings, number of inside rooms on each floor, how inside rooms are to be lighted and ventilated, how halls are to be lighted and ventilated, that living rooms communicate directly with the external air, that each bed-room has a window opening directly to the external air, size of windows opening on light and air-shafts, size of openings at the top of each light and air-shaft, height of louvre sides above the roof, size of fan-lights over all doors, number, size and location of sky-lights, what additional structure, if any, will be on the lot, and the number and location of water-closets, school-sinks and privies. No plan is approved which does not provide in every habitable room at least one window, of not less than 12 square feet area, opening directly upon either the street, yard, or a light shaft at least 2 feet wide, and of not less than 12 square feet internal area throughout its length. The Health Department derives its authority from state and municipal laws, passed in 1881, and the power conferred is being rigorously exercised. The result is that all new houses, —tenements or private dwellings, — are planned in accordance with sanitary principles, and their habitable condition depends upon the material used and the character of the work.

Duplicate plans of all new buildings, so far as their ventilation, light, drainage and plumbing are concerned, are kept on file at the office of the Health Commissioner, subject to the examination of any interested citizen.

INTEREST IN SANITARY MATTERS.

In his annual address before the American Public Health Association, recently held, President Kedzie spoke of the many prejudices which sanitarians have to encounter and of the neglect of proper support. He discussed and answered the objections "that sanitary effort, while it prolonged life, did not really benefit the race," and quoted statistics to show that life is better and grander because of these endeavors to improve the surroundings of the race. As the result of sanitary science, he said the death rate in England had been decreased 12 per cent. in urban and 8½ in rural districts. The number who survive youthful life by reaching the age of twenty has been increased 12 6-10 per cent. during the last few years, while the number of those who pass from twenty to thirty-five years has been increased 12 2-10 in the same period. Two hundred years ago in England small-pox, when it became prevalent, killed ninety-six out of every thousamd, and sixty-six in Germany. Now, the mortality from this cause is less than one in a thousand. Sanitary science has thus saved ninety-five deaths in every thousand in England, and sixty-six in Germany, and such a visitation as the black death in Europe would never be known again until sanitary science became a thing unknown. The number of deaths from typhus fever had been reduced in England more than half, and the same is true of many other diseases. Indeed it had, he said, come to be the belief of scientific and thoughtful men that preventable sickness unprevented is a crime against society, and that preventable death unprevented is a crime against God. He regarded the outlook for the progress of sanitary reform as increasingly favorable and giving much ground for hopefulness. Among the grounds of encouragement he cited the discovery of remedies for splenic fever in domestic animals, the prevention of diseases by the extension of the method of inoculation tried successfully upon animals to the human race, and the discovery of the bacillus, which is the cause of consumption, giving hope that this dread disease, from which one seventh of the deaths in the human family take place, may yet be found curable. Another ground of encouragement was that the question of public health was everywhere receiving attention, as was evidenced by the recent world's sanitary congress, where all the civilized nations of the earth were represented, and also the general organizations of State boards of health. In alluding to the discouragements, he spoke of the indifference of Congress and the Executive to the claims and importance of the National Board of Health, and argued that the present time, when yellow fever and small-pox were both liable to become epidemic, and a visitation of Asiatic cholera was not among the improbabilities, was not a fit occasion for neglecting any sanitary measures that hitherto had been found beneficial.

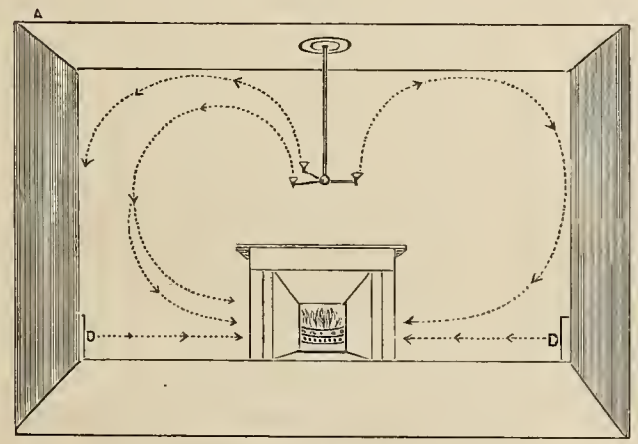
FRESH AIR AND FOUL AIR.

Fresh air is an element upon which everybody professes to set a high value; yet we frequently meeet with people who, by dint of green-baizing the doors, sand-bagging the windows, stuffing up unused chimneys, pertinaciously closing the windows of a railway carriage during a two hours' journey in July, and other similar expedients, endeav-

or to exclude the pure breath of heaven as they would so much choke-damp or sewage fumes. In these days of scientific progress it is surprising that so much ignorance exists on the subject of ventilation; for, while the terms "oxygen" and "carbonic acid" are familiar to everybody, most of us are still in the dark as to the best means to be adopted for securing the one and getting rid of the other. Those who take so much trouble in stopping up every crevice, to prevent, as they say, the ingress of "draughts," never dream that they are at the same time taking every precaution against the escape of poisonous gases, the inhalation of which must ultimately produce a train of disorders, the mere catalogue of which would fill a page of a large-sized medical treatise. Ventilation, as it is understood by such persons, includes amongst its happy effects, cold in the head, sore throat, toothache, and tic doloreux, all of which may certainly be produced by draughts; but this is not ventilation.

Much of this misconception is due to builders, who appear to think that ventilation is altogether out of their line, and consequently make no provision for it. In large public buildings, as schools, churches and clubs, some attempt is usually made to keep the contained air pure; but in ordinary dwelling-houses there is nothing for it but to open the windows, at the risk of entailing upon delicate or non-acclimatized inmates the painful disorders just alluded to. It is far more important to secure a constant supply of pure air in rooms we ordinarily inhabit, than in public rooms only occasionally visited; and architects, as well as builders, have much to answer for in ignoring this consideration in the construction of their plans.

Carbonic acid is a very heavy gas, and it might be supposed that it would fall to the floor as it is generated from the gas-burners, and the lungs of individuals. Immediately, on its formation, however, it is in a heated state, and, in accordance with a universal law of heat, becomes much expanded and rises to the ceiling. Should there be no means of escape in that direction, the gas will, on cooling, descend along the walls of the apartment, as shown by the arrows in the annexed diagram, representing the atmos-



ATMOSPHERIC CURRENTS IN A ROOM.

pheric currents in a room lighted by three gas-jets and warmed by a fire in an ordinary grate. The horizontal arrows at the base of the diagram represent the currents of air proceeding from the doors D D toward the fire. It will be seen that the cooled carbonic-acid gas, as it descends along the walls, is similarly drawn to the fire, and escapes up the chimney in company with the smoke and other products of combustion. Had a grating, or ventilator, been placed at the top of one of the walls, as at A, the deleterious exhalations would have escaped, and the air been preserved in a fit state for respiration.

A fire is an excellent missionary in the cause of ventilation, especially in a room where the green-baize and sand-bag processes have not been adopted to ward off the hated "draughts." The air withdrawn from the room to feed the column constantly rising above the fire must have its place supplied by fresh air from without, which, accordingly, works its way through every crevice and opening, and makes at once for the heated laboratory where its decomposition is effected. A glance at the diagram will make it plain that if there is no ventilator near, the carbonic acid must be respired in its progress toward the fire by persons sitting in the room, unless their dimensions are so Lilliputian that their heads are below the level of the grate. In the absence of any proper provision for ventilation, our only resource is to open the window an inch or two at the top. This will effectually get rid of poisonous exhalations without subjecting any one, not sitting immediately beneath, to the risk of "catching cold."

In bed-rooms, where we remain eight or ten hours at a time, it is most important that the escape of vitiated air should be provided for. On the assumption that the sleeping apartment is occupied by only one person, who requires 20 cubic inches of fresh air at each respiration, or, on an average, 400 per minute, in ten hours he would consume more than 130 cubic feet of air — that is, if he could get it. But how? There is no ventilator; the door is kept shut all night; and as for opening the window but a single inch at the top — the very thought is enough to produce a shudder. Let any one who has been out in the open air enter a bed-room from which the sleepers have just emerged. The oppressive, not to say sickening, character of the atmosphere will at once make itself apparent. And yet people in general do not know to what cause to attribute their morning headache, their lassitude and debility, their loss of appetite, and the impurity of their blood, so painfully evidenced by numerous pimples and blotches. As a rule, our sleeping-chambers are much too small; ten feet square is not an uncommon size for one of these rooms in a house letting at $250 a year. The air of such a room, having its doors and windows closed, and occupied by one person, would become unfit for respiration in four hours. In the case of two occupants, that time would be reduced, of course, to two hours.

It is to be feared that we shall never be able to secure rooms of much larger dimensions, especially in the houses of great cities; it is, therefore, of the highest importance that the introduction of ventilators by builders should be made compulsory. In the meantime, it is easy to improvise a remedy against the atmospheric stagnation and pollution so common in our dwellings. Keep the doors of the rooms partly open, and let down the windows about an inch at the top. There is very little risk in such a procedure, even in tempestuous weather, except to persons who are so frightened at contact with cold, fresh air that they are accustomed to wrap themselves up like a Greenlander whenever they are so unfortunate as to leave their hermetically-sealed abodes.

The subject of ventilation altogether is one which de-

serves more of the attention of social economists than it has hitherto received; for, while we can hardly attach too much importance to questions relating to cottage architecture, water supply and general drainage, it must not be forgotten that there is such a thing as atmospheric drainage, which is none the less important because unseen, and due provision for which is one of the most essential requirements for the maintenance of the public health.

F. R. Eaton Lowe.

THE MARCH OF MALARIA.

The recent reports of commissions and scientific bodies, like the Board of Health, giving the results of careful and extended investigations, notably the papers of Dr. Chamberlain, of Hartford, and Dr. Adams, of Pittsfield, though marked by the habitual caution in generalization and inference which characterizes the scientific mind, make it plain to common sense that the fever, in its several special types, whether dumb or shaking, whatever may be its pathology, or nature, or origin, is due as an existing evil here to decomposition or exhalation and all the morbific and malefic influences engendered about marshy or wet regions and impure water-beds. The best authorities are not sure, or agreed, on the question whether the disease is indigenous or imported, or on the question why it is brought into activity at one time rather than another. They generally concur in the opinion, on both sides of the Atlantic, that it germinates or sprouts in the human body from very minute spores, measuring, perhaps, 3,000 to an inch. But how these seeds are transported about, or what the conditions of receptivity and susceptibility are under which they are developed, nobody can yet tell. There is evidence that sporadic cases occur in dry, upland regions, but the disorder loves marshes, clings to artificial lakes or ponds, riots by the banks of sunk streams, and works its burning and shivering damage most malignantly where the normal mutual relations between soil, vegetable matter and stagnant or moving water have been unsettled. Mention is made of some compact rural populations near foul mill ponds, where half the inhabitants have been down at once. Speculation as to causes, as might be expected, has been busy. What causes of malaria exist now which were non-existent, or in abeyance, so long prior to this late day? Not only is science shy of hasty conclusions, but property, too, has its self-preserving instincts, and the mill-owners and manufacturers are not unwilling to have a part, at least, of the curse rest on other shoulders than their own. What then are the new conditions?

Railroads and tobacco culture are two. The railways are apt to open the surface of low ground, and if there were enough of them, it might happen that an unwholesome gas escaping would affect the workmen, as it is said the upturning of acres of old sod on building lots affect the health of the people in the upper part of the island of New York. But there are altogether too many railways where there are no chills, and too many chills where there are no railways, to allow much plausibility to this theory. It fails twice over. Much of the same may be said of the tobacco fields. The idea that the sickness comes of fertilizers used for tobacco raising has even less support, for that nuisance is of but a very brief annual continuance, and is far from being conterminous with the malady. So far as the great forces of nature are concerned, not much can be done in the way of a remedy. If, as there is some reason to think, there is a constant shrinkage going on in rivers, fountains, brooks and lakes, with a diminished rainfall, throughout this part of the country, all we can do about that is to employ every personal effort to remove or deodorize the stench-breeding, and fever-breeding matter along the banks, and to increase our forests by planting or protection, as many thoughtful land owners are now doing, and as the late forestry convention in Montreal leads us to hope may be done more and more. There are thousands of citizens who, with only a moderate outlay, can stanch, on their own premises at least, the offensive sources of pain and death—for, though not regarded as ordinarily fatal, fever and ague sometimes takes a congestive form, or otherwise overmasters the vital power, in spite of the best treatment, and the patient dies. Dwellers in bad climates study the laws of sanitary safety and heed them. Out-of-door night air can, to a great extent, be avoided. Fires can be built evening and morning. The human system can be kept free, vigorous, and protected by right living, temperance and flannels. Some physiologists think a fine wire gauze at open windows may keep out the spores. A line of thick trees with underbrush has been supposed to arrest them. There is plenty of proof that good drainage counteracts this as it does other kinds of sickness.—*The Boston Advertiser.*

HEALTH IN MICHIGAN.

At the last quarterly meeting of the Michigan State Board of Health, the President suggested work for the future in the line of securing the introduction of text-books on hygiene in the schools, and some amendments to the public health laws. The secretary urged the continuation of immigrant-inspection service through the winter, as the board believed that there was great danger that small pox would be introduced by immigrants from the lower Canadian provinces. Dr. Henry B. Baker presented two diagrams, showing for the years 1877–1880 the relation of deaths from typhoid fever to population, from which it appeared that the common opinion among physicians that this disease prevails mostly between the ages of 18 and 35, and that there is little danger after 40, is not sustained by facts. A greater proportion have the disease at the ages between 60 and 80 than at any other period of life. The subject of compulsory registration of plumbers was referred to a committee for the purpose of having it brought before the legislature at its next session. A bill was proposed making it a criminal offense to communicate a contagious disease, and it will be brought before the legislature. It was stated that it had been proposed to erect a "flame-ventilated" small-pox hospital at Detroit. It was suggested that some action be taken relative to having sanitary science taught in Michigan colleges.

PLUMBING IN CHICAGO.

According to the plan of plumbing approved by the Commissioner of Health, all materials used must be of good quality and free from defects, and the work executed in a thorough and proper manner. All the plumbing in the house must be so placed as to be readily inspected. Every soil-pipe and waste-pipe, of iron or lead, must extend through, and at least four feet above, the roof, of *undiminished size*, and provided with a suitable top or cap. The house drain, if of iron, should have a fall of at least half an inch to the foot, and provided with a proper trap near the street, and with an inlet for fresh air just inside the trap. It should run along the cellar wall, and never be hidden under ground. These iron pipes must be sound, free from holes, and of a uniform thickness of not less than ⅛ of an inch for a diameter of 2, 3, or 4 inches, or 5 32 of an inch for a diameter of 5 or 6 inches. Before they are connected they should be thoroughly coated inside and outside with coal-tar pitch, applied hot, or with some other equivalent substance. All joints in the soil-pipes and waste-pipes must be so calked with lead, or with cement made of iron filings and sal ammoniac, as to make them impermeable to gases. House drains, other than iron, should have twice the internal diameter and half the grade, except by special permission. When lead pipe, or a trap, is connected with an iron pipe, the joint should be made through a metallic sleeve or ferrule, and calked with lead. Every sink, every basin, every water closet, and every tub or set of tubs must be separately and properly trapped, and all traps ventilated by a special pipe extending above the roof. Every "safe" under a basin, refrigerator, or other fixture, must be drained by a special pipe not directly connected with any waste-pipe, drain or sewer. Every water-closet must be supplied with water from a *special* cistern, and not by direct connection with the city water supply. No overflow pipe from a cistern can be directly connected with any soil-pipe, waste-pipe or drain. When the pressure from the city pumping-works is not sufficient to supply the cistern, a pump should be provided. No cistern for drinking water should be lined with lead. Wrought-iron, steam-fitted, glazed pipes are considered the best for house drains. The construction of private catch-basins outside the lot lines, in the public streets, or inside the area of building walls, is not permitted. All discharge pipes leading from kitchen sinks or any other receptacles likely to contain grease in any form, must make direct connection with and discharge their contents into catch-basins; all bath-tubs, water-closets, hand-basins, stationary washing tubs, etc., must connect directly with the soil-pipe or main drain. No sewer pipe is permitted to be placed at the foot of

a ventilating shaft, waste, or soil-pipe. As to general conditions, it is provided that every habitable room must have at least one window opening directly upon the street or yard, or upon a court or light-shaft. Every light and air shaft for habitable rooms must be at least twelve square feet in area for a three-story house, sixteen square feet in area for a four-story house, and twenty square feet in area for a five-story house; and in every case not less than two feet wide in the clear. Shafts between two houses and common to both, must be of double this area and not less than four feet wide. Where the sides of the shaft are allowed by the Department of Buildings to be constructed of studding, they shall be extended above the roof not less than three feet, be covered with glass to admit light, and be provided with openings protected by slats so arranged as to admit air, the openings to be as least equal in area to the area of the shaft. The windows of habitable rooms which open on shafts shall be hung with weights so as to slide vertically, each window to be not less than twelve square feet in area. Water-closets must not be ventilated by a shaft which ventilates habitable rooms; and where they do not open otherwise to the external air, they must be ventilated by means of a separate shaft, not less than three square feet in area, to extend above the roof, and to be arranged for the admission of light and air at the top in like manner as the shafts for rooms. No alteration in the light and ventilation of the premises for which a permit is granted can be made, except upon the express written approval of the Commissioner of Health; nor can any additional structure be erected upon the lot except upon such approval and a special permit. It is required, under the city ordinances, that every house shall be provided with good and sufficient water-closets or privies, of a construction approved by the Commissioner of Health, and shall have proper doors, traps, soil-pans, and other suitable works and arrangements, so far as may be necessary to insure the efficient operation thereof.

NOTES AND NEWS.

PLUMBING AND DRAINAGE.

AN inspector connected with the Health Department has brought to light some defects in the plumbing and drainage of a building on Milwaukee avenue, which are thought to be responsible for the deaths of some of the occupants. and the sickness of others. The waste-pipes from the sinks lead directly into the soil pipe without any intervening traps, and the junction of the soil-pipe with the main drain was so defective that the sewage has been for a long time running out on the ground. About a year ago a child died of what the physician in attendance called croup, and in the succeeding January, another child died of a similar affection of the throat. A physician is in attendance upon a previously strong man of the house, who was prostrated by what was supposed to be the effects of the poisonous gases generated by the sewage.

IN some tests made by Dr. Kammerer, of Nuremburg, on the effects of various acids on the materials used in sewer construction, it was shown that ammonia exercises an effect of such slight importance, that its action can, as a rule, be disregarded. It was found that the destructive properties of muriatic and sulphuric acid on brick, were shown by a loss of substance of from 2 to 23.5 per cent. The losses in the instances of concrete and cement pipes, varied from 13.74 to 37.11 per cent. Glazed pottery pipes withstood the influence of the acids better than any other kinds tested, their loss being from 13 to 17 per cent.

THE master plumbers of this city have a flourishing organization, with the following officers: President, D. J. Rock, of No. 74 North Clark street; treasurer, Patrick Nacey, of No. 1209 South State street; recording secretary, A. W. Murray, of No. 812 West Madison street; corresponding secretary, T. C. Boyd, of No. 42 South Dearborn street.

WATER SUPPLY.

SIXTEEN years ago Mr. James P. Kirkwood advised the St. Louis people to go several miles up the Mississippi for their water supply. They preferred to take the water nearer by, and directed him to build the works now used at Bissell's point. Now the city is growing above those works and fouling the water, and the supply must be taken from some point farther up. Some people want to go to the Missiouri River, as they are afraid that Chicago will turn its sewage into the Illinois River and pollute the Mississippi, all the way to New Orleans.—*The Sanitary Engineer.*

AT Slough, England, the sewers are ventilated by means of pipes carried up inside the gas-lamps. The system is said to be so efficacious that the gratings over the open man-holes leading to the sewers in the streets have been covered with zinc plating.

A SOLICITOR in England has obtained a verdict against a town for $10,000 damages, personal injuries having resulted from the drinking of impure water furnished by the corporation. The water had been impregnated with lead in its passage through the pipes, and the complainant suffered from acute poisoning.

AT New Brunswick, N. J., the domestic water rates are based on the number of persons in each family supplied.

LIGHTING.

THE American District Telegraph Company, of New York City, offers to give the public the benefit of the scientific knowledge and experience it possesses, by establishing a bureau of gas-meter inspection. Reliable men will be employed to make frequent readings of the meters in consumers' houses and places of business, and test them when necessary. This is to be done to the end that the public "may have better light, smaller bills, and the consolation of knowing that they are getting what they pay for, and are not paying for what they do not receive."

THE Pennsylvania Railroad Company is introducing the electric light into its cars, using the Edison lamp and machines in combination with storage batteries in each car.

THE Cincinnati Gas Light and Coke Company has begun the erection of new works which will cost upwards of $1,000,000.

A BERLIN inventor has devised a gas regulator designed to shut off the gas at a given hour.

MISCELLANEOUS.

IN the last monthly bulletin of the mortality and sanitary condition of Lowell, Mass., the Board of Health has something to say about smoke as a nuisance, and speaks of "several of our Western cities" which have enacted stringent laws upon the subject, particularly Cincinnati, Cleveland, and Detroit. It does not seem to know that Chicago was the first city on this Continent, as stated elsewhere, to adopt a smoke ordinance. Not only have stringent laws been enacted, but they have been enforced, and this city is largely free from the curse of the nuisance.

WHOOPING-COUGH is reported by the London Board of Health to be a fertile cause of mortality, not because it is dangerous in itself, but from carelessness, or want of knowledge in treating it. The presence of an epidemic of one disease or even more, does not exercise so large an influence on the death-rate in London, as the continuance of excessive cold or heat, or the frequent occurrence of a fog for a few weeks. In one district all factories which emit noxious vapors or smell, have been banished.

AT the late annual meeting of the British Medical Association, A. W. Mayo Robson described a series of experiments made by him to test the efficiency of the vapors of such substances as eucalyptol, cajeput, terebene and peppermint as antiseptics. The results were thought to indicate that at ordinary temperatures, air satuated with vapors of the class named, was fatal to the germs of bacteria and micrococci, and probably, also, to the germs of fevers and other infectious diseases.

BY reason of complaints by citizens at the Philadelphia Comptroller's office, the pay of contractors engaged in cleaning the streets, is withheld until the work is properly performed.

MALIGNANT diphtheria, more fatal than the yellow fever at Pensacola, is raging in Pittsylvania County, Virginia. Out of 380 cases reported by six physicians, 145 were fatal.

BUILDING INTELLIGENCE.

CHICAGO.

An elegant residence has been designed by Burnham & Root for S. A. Kent, to be located on Michigan avenue, near Twenty-ninth street. It will be 60x100 feet, constructed entirely of pressed brick, with molded jams and string courses in red terra cotta. It is designed in the renaissance of Francis I., the front being decorated with elaborate carvings in panels of red terra cotta and rich friezes. The two large bays which flank the doorway on the main floor, are united in the second story,

and their outer lines are carbelled out to the main wall of the house so as to be included under one great roof. This leaves the front doorway recess in a deep loggia, in which are windows opening into the bays. The only windows in the third story on this front are included in a large twisted gable, which is an elaborately-modeled tympanum of terra cotta. The design and decorations of the front are continued with equal care and finish around the sides. The first story consists of a hall, 18x27 feet, a parlor, library, dining-room, private office, elevator, kitchen, serving-rooms, etc., and the second and third stories are divided into bed-rooms. The first and second stories are finished in hard wood, the first floor being designed to embody, in its detail and decorative carvings employed, the peculiar richness and delicacy of the French chateau of this period.

JAFFRAY & SCOTT, architects, are erecting for Warner, Bushnell & Glessner, manufacturers of the Champion Reaper, a building at the corner of Adams and Jefferson streets, which will be known as the Champion Building, and will be used for the principal offices and salesrooms of the company, It will cover 80 feet on Adams street, and 200 feet on Jefferson, will be five stories and basement in height, and built in Anderson pressed brick, with trimmings in Bedford stone and terra-cotta, the last material to be chiefly used in ornamentation. The elevations will be as massively constructed as any of the late buildings in the business center.

A building is about to be constructed on Adams street, just east of Wabash avenue, which will be devoted solely to art. The first floor will be a salesroom for paintings, etc., and the second floor an art gallery extending upward to the roof. The remaining floor space will be divided into studios. The building will cost not less than $40,000.

D. W. Potter is building stores and flats on Madison street, between Hoyne avenue and Leavitt street, to cost $22,000, from plans prepared by W. A. Furber. Adjoining this, the same architect is supervising the construction of a building for Elder W. C. Willing, to cost $10,000.

A seven-story stone-front store and lauudry is being built on Madison street, between Ann and Elizabeth streets. It has a frontage of 75 feet and a depth of 100 feet. It is reported that George M. Pullman is interested in the building.

Cobb & Frost have prepared plans for the new summer hotel at Lake Bluff, which will be completed in time for the next summer season. It will contain 37,000 square feet of room, and have accommodations for 550 guests.

From plans prepared by Dixon & Townsend, two three-story and basement stone-front stores and dwellings are being constructed on Madison street, opposite Bishop Court, to cost over $40,000.

A three-story and basement residence will be built next year on Michigan avenue, by J. B. Chambers, at a cost of $20,000. He is now examining plans ubmitted by architects.

E. F. Lawrence will soon have completed a brown-stone residence at the corner of Calumet avenue and Twenty-third street, to be finished elegantly in hard wood. Cobb & Frost are the architects.

A three-story stone-front row of stores and flats will be built upon the vacant lot at the corner of Throop and Madison streets, by Emery Bros., of Cincinnati, at a cost of $75 000 or $100,000.

A row of four stone front houses, 84 x 66, at the corner of Calumet avenue and Thirty-third street, is being built for J. D. McAuley, at a cost of $25,000.

The following is a list of all new buildings for which permits have been granted during the past two weeks, giving location, size, cost, and name of owner:

222 W. 22nd st., 1-story addition, 31x27, $1,200; J. V. Gray.
371 N. Wood st., 3-story flats, 21x60, $3,000; Chas. Gnaat.
3612 Barnet st., 2-story dwelling, 21x33, $1,200; G. L. Nichols.
683 Throop st., 1 story store, 21x48, $1,200; F. Hamke.
239 Bissell st., 3-story dwelling, 23x62, $5,000; August Zender.
2307 Dashiel st., 1-story basement, 20x56, $1,500; P. Lenson.
736 W. 12th st., 1-story cottage, 20x40, $1,000; H. Bidwell.
24 River st., 1-story basement, 20x50, $——; F. Dane.
3524 Forest ave., 2-story dwe'ling, 17x50, $3,000; J. H. Gibson.
135 California ave , 2-story dwelling, 20x50, $3,000; Thomas Owen.
Wentworth av. and 23d st., 2-story store and flats, 38x50, $6,000; John Schneider.
117 Jay st., 2-story dwelling, 21x45, $2,000; Sturtevant & Lutz.
208 W. Division st., 3-story dwelling, 26x50, $3,000; A. Anderson.
95 and 97 Hill st., 2 2-story dwellings, 50x45, $7,000; Wm. Temple.
165, 171 and 177 McGregor st., 3 1-story cottages, 22x36, $3,000; E. K. Rodgers.
13½ and 15 Diller st., 2 2-story dwellings, 37x40, $4.500; Cassel, Highe & Co.
555, 26th st.. 2-story dwelling, 25x47, $3,400; P O'Brien.
658 Dixon st., 1-story cottage, 20x50. $1,000; F. Beroki.
714 Noble st., 1-story cottage, 20x50, $1,000; F. Olonsky.
647 S. Ashland ave., 2-story dwelling, 21x48, $2,600; E. Fox.
3540 Wentworth ave., 2-story dwelling, 21x34, $1,200; Joseph Boydall.
Clybourne and Fullerton aves., 3-story store and dwelling, 25x70, $5,000; Fred Zapel.
1 and 3 Whiting st., 3-story dwelling, 50x78, $14,000; John F. Walsh.
133 and 135 Dearborn ave., 2 2-story dwellings, 40x40, $20 000; George Keller.
103 and 105 Desplaines st., 1-story addition, 30x38, $1,500; M. Loveless.
271 Bissell st., 2-story dwelling, 22x56, $4,500; J. B. Farley.
Ashland ave. and 15th st., 3-story store and dwelling, 24x66, $5,000; Dr. L. A. Ruehl.
2720 LaSalle st., 1-story basement, 20x35, $700; J. Mears.
76 Rebecca st., basement, 26x26, $500; John Reidy.
117 Lincoln ave., 2-story dwelling, 22x52, $4,000; C. Thinger.
292 Dayton st., 2-story dwelling, 20x60, $3,000; John Bosch.
186, 13th place, 1-story store and cottage, 22x40, $1,000; ; A. Hollerich.
241 and 243 State st., additional story, 41x144, $12,000; L. Z. Leiter.
3246 Wentworth av. 2-story store and dwelling, 25x50. $3,500; E. B. Smith.
341 and 353 Chicago av., 5 4-story dwellings, 162x72, $50,000; P. J. Sexton.
3033 Michigan ave., 3-story dwelling, 25x86. $10,000; Fannie M. Boone.
158 Samuel st., 2-story dwelling, 21x60, $2,000; Joseph Husak.
634 W. 12th st., 2-story dwelling, 24x60, $4,000; J hn Schroeder.
3742 Lowe st., 1-story cottage, 20x50, $1,000; John Kelley.
284 E. Huron st., 3-story dwelling, 23x62, $10,000; John Kranz.
3200 Prairie ave., 3-story flats, 19x74, $12,000; M. M. Rothschild.
Illinois st., near 32nd, 4 1-story cottages, 20x30 each, $4,000; S. E. Gross.
Ogden ave., near Taylor st., 2-story store. 24x70, $8,000; Charles Bethke.
647 W. Lake st., 1-story store, 20x40 $1,000; Owen F. Aldis.
739 and 741 Ashland st., 2-story dwelling, 43x32, $3,000; W. L. Moss.
457 N. Ashland ave., 2-story dwelling, 21x60, $3,400; Mary Callman.
38 and 40 Quincy st., 4-story factory, 53x80, $1 1,000; Livesey Iron Works.
539, 13th place, 1-story cottage, 20x34, $1,000; J. Wismer.
556, 13th place, 1-story cottage, $1,100: F. Koll.
564, 13th place, 1-story cottage. 20x16, $500: August Rosenthal.
60 Newton st., 2-story rear addition, 22x23, $900; Chas. H. Gersch.
34th st., near Laurel st., 1-story cottage, 20x28, $500; Charles Jaap.
112 Forquer st., 2-story dwelling, 21x50, $4,000.
204 Wilmott st., 2-story dwelling, 20x42, $1,500; Chas. Ott.
463 and 465 Elston ave., 2 1-story cottages, 20x50 each, $2.500; H. Feekamps.
Homan st. and Washington boulevard, 2-story dwelling, 38x50, $15,000; L. Morrison.
469 N. State st., 2-story dwelling, 34x50, $11,000; Louisa J. Bangs.
1014, 31st st., 2-story dwelling, 21x32, $1,460; C. Bergman.
Kossuth and Portland sts., 2-story dwelling, 27x36, $5,500; M. Jedlicke.
11 Corwin place, 2-story addition to dwelling, 20x30. $1,700; J. W. Mass.
239 Kossuth st., 2 story dwelling, 21x60, $3,000; Waclow Schery.
Genesee and 25th sts., 1-story cottage, 22x40, $1,500; J. T. Dale.
391 W. 16th st., 2-story dwelling, 20x56, $4,000; Joseph Sliman.
931 W. 20th st., 2-story store and dwelling, 24x60, $4,000; F. Conrad.
730 Loomis st., 2-story dwelling, 22x32, $2,200; F. Horazdoosky.
475 W. 20th st., 2-story dwelling, 21x32, $2.300; Josef Jonata.
18th st., 2-story dwelling, 20x30, $1,800; Jan Hula.
64 and 66 N. Center ave., 2 basements, 40x40, $1,000; A Amundson.
Canalport ave. and 21st st., 2-story dwelling, 20x60, $5,400; W. Krueger.
691, 18th st , 1-story cottage, 20x50, $1,500; M. Kalal.
Van Horn st. and Ashland ave., 2-story dwelling, 24x74, $3,000; J. G. Fisher.
Laflin and 17th sts., 2-story dwelling, 24x56, $4,000; Josepf Breuer.
Van Horn st., near Paulina, 1-story cottage, 24x70, $2 000; Josef Kolar.
Paulina and 14th sts., 2-story dwelling, 44x63, $6,700; B. Oswald.
717 W. 17th st., 1-story dwelling, 21x56, $2,400; John Mallek.
3622 Dearborn st., 2-story flats, 21x50, $4,000; Foolen & Maloney.
North ave. and Noble st., 1-story cottage, 20x44, $1,000; J. Kline.
3533 Indiana ave., 2-story dwelling, 22x50, $4,000; B. F. Fitch.
195, 18th Place, 2-story dwelling 21x50, $2,000; Frank Maack.
40 E. Harrison st., 4-story flats, 20x48, $7,000; Dr. Clapp.
Monroe st., near LaSalle, 2-story addition, $700; Rand & McNally.
Indiana ave. and 14th st., 4-story hospital, 153x80. $115.000; St. Luke's Hospital.
178 Orchard st., 2-story flats, 22x52, $4,000; H. Elin
408 Harrison st., 3-story flats, 25x65, $4,500; H. Stompe.
847 Indiana st., 2- tory store and dwelling, 25x44, $3 000; J. Berry.
555 Huron st., 1-story cottage, 20x30, $1,000; Geo. Prince.
2,890 Archer ave., 3-story store, 45x100, $17,000; John Stephens.
15 Californ a ave., 2-story dwelling, 22x43. $2,000; C. Baldwin.
192 and 194 Winchester ave., 2 3-story dwellings, 45x50. $7,000; L. Lloyd.
3020 Vernon ave., 2-story dwelling, 25x52, $5,000; James M. Love.
1314 W. Jackson st., 1-story basement, 24x16, $200; R. C. Harper.
577, 26th st., basement, 44x46, $1,000; Theo. Dochermain.
791 and 793 W. Monroe st., 2 2-story dwellings, 44x39, $3,000; S. I. Pope & Co.
34 to 38 Ruble st., basement, 48x42, $2,000; F. E. Hall.
Indiana st., near Oakley, 1-story cottage, 20x26, $1,000; B. A. Hill.
182 Rumsey st., 1-story cottage, 18x20, $500; Jos. Paveritz.
188 to 192, 4th ave., 6-story warehouse, 65x95, $20,000; Bradshaw & Waite.
Hoyne ave., near North ave., 3 story dwelling, 21x43, $3,600; H. Biller.
Peoria st., near Adams, 3-story flats, 45x61, $13,000; Baldwin Bros.
780 Sedgwick st., 3-story flats, 25x58, $6,000; John Thompson
33d and Jones sts., 5 2-story dwellings, 120x36, $7.000; Alex McIntosh.
426 and 428 Randolph st., 2 3-story dwellings, 48x60. $10 000; A. J. Snell.
537 Wentworth ave., 1-story cottage, 20x40, $1, 000; B. Halley.
413 to 417 Fifth ave., 1-story addition, 66x106. $5,000; Ellen H. Preston.
430 Blue Island ave.. 1-story cottage, 24x40, $1,200; Albert Needham.
3511 Fifth ave., 1-story cottage, 22x42, $1,200; Alfred Delcourt.
540 S. Western ave., 2-story store and dwelling, 24x50, $3 600; William Baker.
105 Blackhawk st., 2-story dwelling, 22x60, $4,000; A. W. Ruderich.
3209 Portland st., 1-story cottage, 21x28, $1,000; George Love.
2908 Butler st., 1-story cottage, 20x40, $1,000; Turner & Bond.
676 Larrabee st., 2-story store and dwelling, 25x58, $5 000; H. Smyth.
81 LeMoyne st., 2-story dwelling, 22x45, $2,500; C. Zierker.
Indiana ave., near 22nd st., 3-story dwelling, 28x60, $4,000; C. L. Dix.
235 Holt ave., 1-story cottage, 20x28, $800; I. Habrevlitch.
2956 S. LaSalle st., 2-story dwelling; 21x40, $2,300; Mrs. M. Sinnott.
19th and Clark sts., 5 3-story stores and dwellings, 150x50, $25,000; C. L. Jenks.
429 Ogden ave , 3-story store and dwelling, 22x75, $7,000; Herman Repenning.
381, 5th ave., rear, 2-story dwelling, 20x26, $4 000; F. Worot.
637 S. Ashland av., 2-story store and dwelling, 23x60. $4,500; John Cowey.
184 Ambrose st., 1-story cottage, 20x46, $1,200; J. Wilken.
3612 Wallace st., 1-story cottage, 21x40, $1,000; W. Whirity.
422 Johnson st., 1-story cottage, 21x46, $1,000; William Green.
388 to 326 Bissell st., 12 2-story dwellings, 264x55, $50 000; John T. Davis.
363 Paulina st., 1-story cottage, 20x32, $800; Fred Subert.
637 and 639 S. Halsted st., 2-story office and foundry, 40x20, $2,000; William Gilman.
721 and 733 W. Monroe st., 2-story dwelling, 25x40, $14,000; J. W. Litchfield.
583 Wells st., 3-story dwelling, 22x60, $5,500; F. Heid.
531 Hudson ave., 1-story cottage, 21x40, $3,000; James Grace.
28 Rebecca st., 1-story cottage, 20x32, $1,000; John McMahon.
3010 Emerald ave., 1-story cottage, 20x42, $1,000; Theodore Kaiser.
111 to 117 Michigan ave., 6-story store, 91x162, $90,000; Smith, Gaylord & Gross.
2245 and 2247 Wentworth ave., 3-story dwelling, 50x70, $10, 00; John S. Oehman.
758, 19th st., 1-story cottage, 20x40, $1,200; Charles Kupfer.
196 and 198 Desplaines st., 3-story factory, 50x150, $20,000; George C. Hutchinson.
2524 Calumet ave., 4-story dancing academy, 60x127. $30,000; A. E. Bournique.
288 to 292 S. Ashland ave., 3-story dwelling, 50x72, $18,000; E. H. Valentine.

The Sanitary News.

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CONTENTS.

THE OUTLOOK 13
CURRENT TOPICS:
Gas from Stoves and Furnaces 13
Disparaging Views of Chicago 14
Unventilated Sewers and the Result 14
A Substitute for Lumber 14
The Water Supply of New York 14
Arsenic in Wall Papers 15
Unjust Treatment of Plumbers 15
LIFE IN TENEMENTS 16
DELUSIONS OF DISINFECTION 17
SCIENTIFIC VENTILATION 17
HEALTH IN THE COUNTRY 18
FOREIGN SUBSTANCES IN THE AIR 20
THE SEWER-GAS QUESTION 20
COMING TO CHICAGO 21
OCTOBER MORTALITY IN CHICAGO 21
THE POOREST AND THE BEST PAVEMENT 22
ENGLISH PLUMBING AND DRAINAGE 22
IMPROVEMENT IN ARCHITECTURE 22
THE SANITARY ADVANTAGES OF HIGH LIVING 22
CONSUMPTION CONTAGIOUS 22
WATER-SUPPLY IN VANDERBILT'S HOUSE 23
HEALTH IN MICHIGAN 23
PUBLICATIONS RECEIVED 23
NOTES AND NEWS 23
BUILDING INTELLIGENCE 24

THE first number of THE SANITARY NEWS met with more than expected favor. The encouragement given to the enterprise when it was first discussed with those interested in having Chicago and the West represented by a sanitary news and scientific journal has been repeated and increased. Under such auspices the paper ought to and will succeed. It is not to be expected that everybody will be interested in and read it; there are many who laugh at any suggestion as to the care of one's health, and the comfort and attraction of a home, and there are also others who "know all about it now." A gentleman, who conducts a business which this paper hopes to make more profitable to every one engaged in it, by increasing the demand for the very nccessary appliances which it furnishes, — and who is, by the way, a city official, — said: "No, I don't want yer paper, n'r will I adver*tise*. I never advertise, n'r read. What should I for; I know all there is to know in the business now. I take a paper to be sure, but it's from force of habit — I never read it." This was a rare and, thus far, an only exception. Subscriptions are readily obtained on solicitation, and many have already come in unsolicited from all parts of the country. The matter of the paper has received approval and its appearance excited admiration. It will continue to be first-class in every respect. Dr. Oscar C. De Wolf, Commissioner of Health in this city, will contribute editorially to its columns, and will at once furnish a series of articles on domestic sanitation. The next number will contain a description of Blair Lodge, an elegant country residence at Lake Forest, by Mr. W. L. B. Jenny, the architect of the building, in which special reference will be made to its sanitary arrangements. The article will be accompanied by illustrations of the building and the drainage, plumbing, etc. Contributions have been promised by Prof. V. C. Vaughan, one of whose specialties in the University of Michigan is sanitary science; by Dr. Henry B. Baker, secretary of the Michigan State Board of Health, whose reputation in sanitary matters is widely known, and by others. The continued coöperation of all readers in promptly forwarding subscriptions and speaking favorably of the paper to others is solicited. It is hoped that mutually pleasant and profitable relations may be sustained between the paper and its patrons, and to that end correspondence, whether relating to business, or for publication or inquiry, will receive the most respectful and prompt attention. This number may find its way to the hands of many who received the first as a sample copy; this is not to be taken as an indication that the paper will be sent indefinitely. To secure future issues the blank order sent out with the first copy should be filled and returned at once. A limited number of copies of the first number can be had, and they will be sent to those who subscribe now, if they so order.

As cold weather sets in the occupants of well-built houses are liable to be subjected to a danger which is seldom apprehended. No coal stove is so well made that gas will not escape from it into the room; indeed, it is said to pass through the iron itself. The ordinary furnace is such an extremely poorly built affair that coal-gas is almost universally drawn up into the hot-air pipes and circulated through the rooms. It usually escapes in such small quantities that it is not noticed, but it is at the same time injurious. Back dampers should never be kept tightly closed; if partially open it may require a little more coal to heat a room, but the saving in the protection of the health will be more than counterbalanced. This precaution should especially be taken at night, just when people are more apt to close their stoves. A hod of fresh coal on the fire on retiring, the dampers and draughts shut and no windows or doors open, those who sleep in the same room in which there is a stove are sure to rise in the morning with a headache and a general lassitude, which unfits them for the day's work, and the chances are that they will be asphyxiated. A coal stove and an open register should never be admitted to a bedroom, unless there is also kept burning a grate fire.

THE eastern newspaper man lets pass no opportunity to speak disparagingly of Chicago. Its rapid growth and unparalleled prosperity annoy him. Any little compliment which he is led, inadvertently, into paying the city, is rounded off by some reflection on some unfortunate circumstance, or condition, which dooms Chicago to everlasting disgrace. A good illustration of this has appeared in the following paragraph in a New York paper: "How the star of empire takes its westward way is pretty well indicated by the growth of Chicago, which has, now, a population approximating 650,000 people. Many who are still in the prime of life remember what is now the great city as the small village. Well, this is, indeed a wonderful country, and it is difficult, even for Americans, to keep informed as to the details of its mighty progress. Unfortunately for the architecture of the city of Chicago, it is doomed to the use of bituminous coal, which, as manufacturing increases, must blacken the beautiful stone on which the city chiefly depends for its fine façades." It is true that Chicago must depend upon the use of bituminous coal for manufacturing purposes, but it is a matter of choice as well as of necessity. The city does not propose to forsake the interests of its own state, whose rich and extensive coal-fields are equaled in capacity to supply fuel only by the capacity of its metropolis to consume the product; but Chicago has already figured out the economy in the use of soft coal in the protection of boilers, and its superior steam producing qualities. Most important of all in this connection is the fallacy of the statement that the use of bituminous coal "must blacken the beautiful stone on which the the city chiefly depends for its fine façades." Chicago has been the first city in this country to undertake to abate the smoke nuisance, and it has already been demonstrated, through the judicious and energetic enforcement of the ordinances by the Health Department, that the troublesome belching of smoke by the chimneys of manufacturing establishments, to which the eye of the eastern man is so accustomed, can be prevented. As perfection can not be attained in a day, there is still some smoke seen creeping from tall smoke-stacks, but the city is practically free from the curse, and the day is not far distant when it will, undoubtedly, be entirely a thing of the past.

THERE is precious little forethought used in any work which, after being completed, is hidden from sight. It is undoubtedly due to the fact that plumbing and drainage are not subject to ready inspection that so much carelessness is manifested in doing that work. There are plumbers, drain-layers and sewer-builders who understand their business, and they are conscientious enough to do their work well, although they may know that it will never be seen. There is no excuse, however, for a city to do what Chicago has in some of its streets on the South side. There is a large main sewer running east along Thirty-fifth street and emptying into the lake. South of it, in streets at right angles to Thirty-fifth street, are smaller sewers which extend south to the city limits, and there end abruptly. Although other sewers in the city have open man-holes for ventilation, these particular branches have none. What is the result? The open mouth of the Thirty-fifth street sewer is so low that in high winds the water of the lake in driven back into the sewer, and the foul gases generated in it are also driven backward. In the branch sewers on the south side of the main, these gases have no means of escape, and being compressed, they are forced back through the house-drains, in spite of traps, and it is not an uncommon thing to hear the sewer air escaping from the outlets of wash-basins and water-closets in puffs. The stench in some of these houses is, at times, unbearable, and the inhabitants are constantly appealing for relief. A gentleman rented a house on Vincennes avenue some weeks ago, but he still eats and sleeps, with his family, elsewhere, hoping to have the house made habitable before he moves into it.

SANITARIANS and economists alike have been greatly lamenting the rapid destruction of our forests. Trees conduce to the health of a country, and no one has dreamed that houses can be built without the use of lumber, in whole or in part. But as it has been found that a country may be made more healthy by clearing off low places — sweeping out of existence natural forests — and planting new trees, such as the eucalyptus, so some one has invented a substitute for lumber, and it is not at all improbable that this will soon take the place, largely, of the natural wood. It is a material composed of clay and saw-dust, and is known as Terra-cotta lumber. The substances named are manipulated by machinery and worked through different processes to a finished product which is as cheap as and not unlike brick. It can be bored and nailed and treated with edged tools like wood. In the manufacture the saw-dust is screened and then mixed with clay of the finest quality. After being ground it is molded into different sizes and shapes. It is allowed to stand in the drying-room until all the moisture evaporates, and is then transferred to the kilns, where it is burned. It is claimed that this material is indestructible, either by fire or water. A company at Crow's Mill, near Perth Amboy, N. Y., is manufacturing more than fifty tons daily, of this Terra-cotta lumber. In the presence of a visitor at the factory, the foreman, to display the non-combustible qualities of the lumber, withdrew from the center of a burning kiln a red-hot piece about four inches square and plunged it into a pail of water. After cooling it was placed upon the forge and the water with which it was saturated expelled in the form of steam. The foreman then poured petroleum over it and applied a lighted match. Subsequent examinations of the block, by sawing it in two, disclosed no difference between it and other material which had not been submitted to such a test. Plastering adheres to the material with great tenacity, no lathing being required. It will be invaluable in the construction of Mansard roofs. No known substance equals it, it is said, for sheathing around boilers, as it is the best non-conductor of heat in the market. It is cheap and can be sawed to any desired thickness, shape, or size. It will undoubtedly prove very useful as a sheathing for pipes through which it is desired to transmit steam through long distances, as heat is now soon lost by radiation. The uses to which Terra-cotta lumber can be put would seem to be almost without limit.

THERE are said to be about eighteen hundred driven, fifty artesian, and as many dug, wells in New York City. The greater part of the driven wells have been sunk within the past three years. Many of them are put down secretly

to escape the notice of the health officers, who are likely to condemn them because they are alleged to be unhealthy. During the past four months the water from these wells has been analyzed at the School of Mines, and it is reported that it is generally contaminated with organic substances and extraneous matter, such as appears in drainage, and has an excess of mineral ingredients. The surface drainage is said to get in by percolating through the earth and running down the iron pipes. Much of the well water is found to be highly charged with lime and magnesia salts, making it highly indigestible. Hotels run it through Croton pipes at great peril, because it contains so much carbonic acid that it takes up lead, causing more or less poisoning. The chemist who made the examinations reports that he found eleven tenement and flat houses where it was pumped up into lead tanks, the water undergoing such a change that it was unfit for use, either for drinking, cooking or bathing. In the Westchester district he found the water very bad, as it contained a large amount of drainage. Wells on the Harlem flats contained 688 grains of solid and extraneous matter to the gallon; in West Fifty-sixth street, 56½ grains; in Grand street, near the East river, 50 grains; in the Westchester district, 7 grains — mostly drainage; in Broadway, near Wall street, 20¼ grains; in East Forty-eighth street, 22 grains, and near Columbia College, 35¾ grains. A well at the New York hospital ran so heavily in iron and other minerals that it had to be abandoned. It destroyed all the pipes and vessels with which it came in contact, and could not be made of use even as waste water except at great expense. The water from these wells is used to some extent, for domestic purposes, and for the manufacture of mineral waters and other beverages, though mainly, it is said, for cooling and washing purposes, and for steam-making and other industrial purposes. It is estimated that the revenues of the Board of Public Works have been reduced, by its substitution for Croton water, by $400,000 a year, and it is on this account that the city authorities have finally roused themselves to the investigations now being made, and to an active opposition to the wells.

A GREAT deal has been said and written about the dangers lurking in the highly colored wall-paper used in our homes. It is consoling to learn that a chemist has made some anaylses and found that the common belief is not sustained. The investigator referred to was A. A. Jones, of Grand Rapids, Mich. In his published report he says that he analyzed fifty samples obtained from one of the best stocks in Grand Rapids. He selected from grades running from the lowest to the best. In this selection he noticed that there are not so many green papers made at present as there have been, they apparently going out of use. Out of fifty analyzed he found that three contained arsenic in dangerous amounts, respectively, 17.08, 11.76 and 9.47 grains to the square yard. Twenty-eight of the papers had no arsenic in them at all. The other nineteen contained mere traces due to aniline dyes, but not enough to warrant a quantitative estimation. These were the best papers, strange to say. The three with large amounts were the middle grade of papers. The one containing the largest amount of arsenic was drab; the others were green. Arsenic is found in Scheele's green, or arsenite copper, also called Swedish green. Another form is Schweinfurts green, or aceto-arsenite of copper, also called Vienna green, both passing under the name of Paris green. These when mixed with other substances, as copper sulphate or carbonate, form different shades as Mountain green, Brunswick green, etc. Brown and green mixed form a drab, so one paper is as liable to contain arsenic as another. Arsenic in paper, continues the report, is likely to prove poisonous by being erased from the wall by different articles of furniture, and being suspended in the air and inhaled into the lungs where it acts as rapidly as if taken into the stomach. Children are liable to rub their fingers on the wall and carry the poison into their mouths. Both German and American chemists have found large amounts of arsenic behind beds and furniture in sleeping-rooms. This proves how easily arsenic may be detached from walls. The manufacturers of wall-paper claim that they do not use arsenic at all. Mr. Jones is satisfied by his results that they do really use but little, if any. In all save three of the instances in which arsenic was found it was due to the use of aniline containing arsenic.

THE plumber is a much-abused man. It is time that the public began to inform itself more thoroughly about his business. It is no secret and does not need to be carried on in the dark. There is no reason why every householder should not understand how plumbing should be done, and when and where it is needed, except of course, so far as the mechanical part of the work is concerned. If this were the case, there would be less grumbling about the supposed extortions of plumbers and their alleged bad workmanship. The fact is that the plumber, as a rule, is misjudged. He is sent for to do a piece of work, like putting in a sieve at the outlet of a sink, packing a valve in a water-closet, or inserting a trap in a waste-pipe. The trap is probably suggested by some newspaper article, or a physician who has an indefinite idea that a trap is a hygienic necessity in a house. If the plumber evinces a desire to put in good material and superior traps, or does his work carefully, then he is accused of conniving to increase the bill; and, finally, because the bill contains an estimate for labor by the hour, and for solder, putty, etc., used, he is denounced. The public opinion of a plumber is that he ought to work for nothing and supply all materials without cost, unless, perhaps, he should have occassion to use a great quantity of lead pipe, or a water-closet itself, which are conceded to be worth paying for. If the people understood something, or all, about the requirements of a good system of drainage, and knew when it was actually out of repair, the plumber would be accorded the respectability, honesty and dignity which belongs to him. It is true that some plumbers are dishonest, and others incapable; but this is an exception in all professions and branches of business. Plumbers would soon be without an occupation, who depended for profit upon what they could steal in time and sell in goods not used, and who could not distinguish between the odor of sewer-gas and a dead rat, if those who need their services would first inform themselves. Plumbers should be encouraged as the friends of humanity and not as their enemies.

LIFE IN TENEMENTS.

The rapid growth of the city of Chicago has necessitated an overcrowding in its buildings which is certain to have an important bearing upon its future health. It is impossible to build houses fast enough for the people who are coming here in a steady and swelling stream. Buildings are springing up everywhere, and before they are completed nine out of ten of them are leased and occupied. Most of the new houses now are for families of moderate means. These take advantage of the opportunity to get out of an old house into a new one, and they can afford to at the present time, as the industrious are prospering. Thus there are no new houses for the poor and ignorant, who are compelled to stay in their old huts, or, if they move, get into quarters which have been deserted by others. The old houses vacated will not hold all the new-comers singly, hence there is nothing left to do but "double-up." Poor families rent their rooms to other families, and the members of each huddle together in two or three small inconvenient and unventilated rooms. There is more than one instance in the city in which the original tenent, by cooping his family up in the basement or kitchen and a small bedroom, derives a considerable income from the rents he receives over and above that which he pays for the entire house. This means that there is not only overcrowding, but that which is inhuman. It calls for the interference of the municipal authorities. But, to thin the people out means simply to turn them into the streets. There is a a three-story house on Ingraham place which contains ten families. Each floor is divided into apartments of three or four rooms each, and in them the families eat and sleep. There are none of the conveniences which are considered necessary adjuncts of a city house. A common hydrant on the ground supplies all with water, and the poor women who live on the upper floors have to carry it up two flights of stairs. In these ten families there are fifty-three persons, each of whom has an average of very much less than one room to himself. A three-story and basement house on West Indiana street, containing thirty-six rooms, is occupied by sixteen families, of sixty-four persons. Thirteen families, of fifty-nine persons, occupy a small and rickety two-story and basement house on South Jefferson street. In a three-story and basement house on Milton avenue there are eighteen families, or sixty-six persons. There are four families, of thirteen persons, living in a one-story house at No. 30 Burlington street, one family to a room; and the same state of affairs is found next door.

These are figures taken from reports made by inspectors of the Health Department. They are only a few out of hundreds and even thousands. They convey only indefinite ideas of the actual condition of these people. To the man who has plenty of room, they suggest discomfort in narrow quarters only; it does not occur to him that disease finds a productive soil in the vitiated and organic-laden atmosphere, which feeds the lungs of the occupants, and that death is a frequent visitor among them. Epidemics start in overcrowded tenement houses, and one succeeds the other the year round. When diphtheria and scarlet fever are not carrying off the children, typhoid fever and consumption are at work among the older people. The tenements of the poorer classes are found in distinctive localities, and they are uniform in appearance and inconveniences. They are found principally on West-side streets, along the river, and on South Clark street and short streets near it, or branching out from it. There is overcrowding among the Poles in the northwest part of the city, and the Bohemians in the southwest. The German poor congregate mainly on the North-side, along the river, and their surroundings do not have the pretense of neatness and comfort which is found in reality among the former classes. The Italians are found on South Clark street, or its immediate vicinity, and they care least of all for habitable quarters. It is no uncommon thing to find a family of five or six actually living in a single room, and that not large enough for a healthy bed-room. Why they do not die long before they do is, indeed, a mystery to a man who pretends to have some regard for his health.

What shall be done about it? Evidently it will do no good to talk to these poor creatures about sanitation. They could not be induced to rent better houses, even if they were to be had. All they want in this world is life, and exertions to acquire such luxuries as a clean floor and pure air are considered wasted. The meanest houses are cheapest and answer every purpose of mere mechanical living. The public has an interest in improving their condition whether they are willing or not, for the reason already stated that the public health is influenced very greatly by the condition of tenements. There are but few exceptions to the rule that every man can put his family into a comfortable and healthy home if he will; besides, a comfortable and healthy house is not necessarily expensive. Tear down the old rookeries and thus compel landlords to build better houses of the cheaper class to meet the demand which will then exist. There is great need in Chicago of more buildings for poor people.

New York has an Association for Improving the Condition of the Poor. In its thirty-ninth annual report, just issued, it says that more than half the poverty and destitution in that city is caused by the insufficiency of comfortable house accommodations. There are 22,000 tenement houses in New York, each containing from four to forty families. Improved dwellings have been built under the supervision of the society on Seventy-first and Seventy-second streets and First avenue, and they are said to be a success. The death-rate for August last was 30.2 per 1,000 for New York; that of London for the same period was 18.8. The difference is attributed to the tenement house evil. One of the greatest evils existing among the class benefited is found by the society to be in the negligence of owners of tenement houses to keep their property in a condition fit for human beings to live in. The lack of water in the upper stories of tenements is almost universal, and prevents cleanliness on the part of the occupants. Improper plumbing arrangements and no ventilation in the apartments causes sickness, while the foul odors and impure atmosphere from unclean streets, and on the east side of the city from still unabated nuisances in Hunter's Point combine with local causes in rendering the small rooms inhabited by so large a portion of that city's population, places that are anything but comfortable homes.

DELUSIONS OF DISINFECTION.

The importance which germs have lately assumed as the seeds, or exciting cause, of the infectious group of diseases — and several forms of these low organisms, their history of growth and development, and the *rôle* they play as disease-producers, seem to have been very accurately determined — makes it necessary that those who study such matters should keep the public informed as to what extent we can hope to destroy these germs by disinfectants. It is probably true that science does not at present afford many rays of light in this important investigation, but let us utilize what we have until the chemists give us more. The distinction between disinfectants, antiseptics and deodorizers should be kept in mind. A disinfectant is defined as a substance, or agent, which destroys infection, or the seeds of disease. An antiseptic is an agent which prevents decay in organic material liable to decomposition.

Disinfectants are often antiseptic in their action, that is, after their proper application, putrefaction is arrested, but anticeptics may not be disinfecting in their action. Vinegar, sugar and salt are familiar examples of antiseptics used in the household, but they are not disinfectants, for they do not destroy the germs of disease in a piece of trichinous pork. On the contrary, some agents used as antiseptics are powerful disinfectants, as arsenic and corrosive sublimate.

Prolonged and high temperature is a powerful disinfectant, but it does not prevent decomposition of the material. Freezing is an antiseptic because it arrests putrefactive changes, but it is not a true disinfectant, for it only suspends the vitality of some of the forms of germ-life, which start into activity again when warmed. The gases generated in the decomposition of animal or vegetable matter are incapable of themselves of producing the germs of infectious disease; yet they are unwholesome and deleterious, and more important still, they are the pabulum upon which the specific germs grow and multiply and thrive, when once introduced. It is this fact which renders unventilated sewers and cesspools so dangerous to abutters connected with them. The ammonia and sulphuretted hydrogen so freely generated in these dark, damp, warm caverns supply the conditions exactly suited to the rapid multiplication of disease-germs which are floated along with these gases wherever they penetrate. Just so far, therefore, as deodorizers — which may be neither disinfecting nor antiseptic — will neutralize and destroy these gases, just to that extent they are useful in the double function of removing disgusting odors which debilitate and predispose to disease, and of destroying the foods which nourish and develop the specific disease germs. But it should not be forgotten that if these gases, as they enter our dwellings, have become carriers of germs of scarlet fever or diphtheria, or small pox, or typhoid fever, to remove the odor of the carrier is a secondary and comparatively unimportant matter, for the germs, which are the real agents of disease, are left untouched.

Herein lies the great error of ordinary sick-chamber or dwelling fumigation. A few saucers of chloride of lime scattered about in halls and water-closets and chambers may destroy the odors of the sick room, or of sewer-gas, in the house — at least, they substitute one odor for another — but they probably have no more influence upon the germs of disease than they have upon the appearance of the next thunder-storm. No atmosphere in which a human being can live will act destructively upon these organisms.

SCIENTIFIC VENTILATION.

Persons who ever suspected that they did not know all about ventilation are very scarce; and yet there is absolutely nothing, even to the most abstruse science, about which so little is really and positively known by the public. There are specialists in the business of ventilation who have picked up some practical ideas, but the householder, as a rule, knows no more of ventilation than he does of the germ theory of disease. "Is your house well ventilated?" was asked of the proprietor of one of the leading hotels in this city — a building which has gained the distinction of "palace." "Certainly," he replied. "That is one of the things to which I gave special attention when I built my house. I looked into all the schemes and devices which came to my notice, and finally fell back on a plan of my own. See; I have left cracks in those outer doors, and the window casings do not fit close. I have cut holes in the sash, too, you may notice, over which a moving cover fits. Although the fresh air can not be shut out entirely, it may be that we don't get enough in here on some days, and then I have those openings uncovered. The hot air rises, you know, and goes up to the top of the building. I have trap-doors in the roof over some of the halls, and when it gets too hot these are opened and the air escapes. There are transoms over all the doors opening into the halls, and the rooms are thus provided for. Yes, sir, ventilation is one of the things to which I gave special attention." The gentleman who wrote the definition for the word "ventilate" for Webster's dictionary, says that it means "to air; as to ventilate a room." The practical ventilation of the hotel proprietor, and the theoretical, of the dictionary-maker, are equally scientific and intelligible. Ask any man if he would ventilate his house and he would say yes; ask him how it should be done, and, astonished at your apparent ignorance, he would be likely to say, "Why, ventilate; open the windows and doors and let in the air." To suggest to a man that he is really not ventilating the rooms in which he lives, or sleeps, although he may have enthusiastically provided supposed means to that end, has about the same effect that advice has when older and experienced people suggest to young men and young women that there are a few things to learn about matrimony — they know all about it. Physicians are getting into the habit of instructing nurses to keep sick rooms "well ventilated"; architects mention the matter cautiously to patrons, and city health authorities require "ventilation." It is now almost a universal requirement to provide ventilation in house-building and warming. A rule to be observed in the construction of all buildings under Her Majesty's Office of Works in England, prepared and issued by the secretary of the Office of Works, is as follows: "Great attention shall be paid to insuring thorough ventilation in all rooms. Rooms so high that their ceilings shall be more than two feet above the top of the windows, corridors, staircases and other open spaces shall be specially ventilated so as to prevent the accumulation of stagnant air." But not a word is said to how this ventilation shall be provided, and when it is remembered that no two agree on this point, there need be no wonder when the so-called ventilation has proved a failure.

It is time that somebody knew what ventilation is. In the future everybody ought to know. But people learn

slowly, and not at all without teachers. Before there can be teaching there must be facts, and when the facts relating to correct ventilation are established and classified, then there will be scientific ventilation, and a basis to work upon. Opening windows and doors is not ventilation; neither is driving air into a room by a fan, nor drawing it out by similar means. Heating the air by furnaces or stoves, causing it to rise, and expecting it to pass out doors, through such cracks as there may happen to be in the walls, will not answer. An open grate, which induces currents, the hot air escaping up the chimney, and cold — possibly fresh — air rushing in from halls, basements and the street, does not suffice. Again, there is failure when openings are provided near the ceiling for the escape of vitiated air. It is a pity, and yet a mercy, that we can not see, as we might if our eyes were powerful magnifying glasses, the living forms that seem to spring into existence and multiply in air that has been made foul by breathing, and in other ways; and it is unfortunate that the poisonous gases which take the place of the pure oxygen in an occupied room do not sting or burn, so that for comfort there must be escape from them, if they could not be expelled. It is hardly less than a crime to compel, or induce, people to go into rooms such as those of the public library of this city, in which the air is so foul that it is nauseating. The employés of the library are, almost half the time, away on leave of absence because sick. The library board wonders at the sensitiveness of the women to a "little bad air," and orders the opening of windows. The air is still unfit to breathe and absolutely dangerous to every visitor. Scientific ventilation means, so far as it goes, a gradual and constant change of air in a room, sufficient to carry entirely out of the building all impurities, whether organic or gaseous, and without change of temperature. Correct ventilation will guard against the introduction to a room of any but pure air, or that which is as pure as can be obtained.

Air is not made impure and dangerous alone by breathing it, nor by slaughter-houses and fertilizing establishments, the decay of vegetables and decomposition of organic matter in the house, or on the street; nor by the gases escaping from sewers. Ground-air has very much to do with bodily ills, and in this connection it may be referred to appropriately, as few houses are protected against it. In an address delivered by Dr. Max Von Pettenkofer before the Association of German Naturalists and Physicians, at Salzburg, and which was published not long ago in *The Popular Science Monthly*, the doctor said: "That the air in the soil does not become stagnant, but is always in motion, though sluggish, not only follows from physical laws, but may be easily proved by experiments and observations. Our houses are aired or ventilated in no small degree by the ground air. Renk has been inquiring, with the aid of Recknagel's differential manometer, whether the air flows from the ground into the house or from the house into the ground, and has found that through most of the year the draft is from the ground into the house. He has also found that the ground-air, which is sucked into the house, brings dust with it; and other observers have shown that the same air also carries germs susceptible of development in suitable solutions. It is thus easy to see how the soil affects our health without our having to eat it; the ground-air plays the part of an always ready intermediate agent, so far as concerns the molds. In this light it is easily seen why some houses sometimes have to suffer so badly from certain conditions of the soil, especially when they are badly ventilated. The movement of the air in a close house is many thousand times less active than where the circulation is free; and the air entering into the house suffers correspondingly less dilution than that passing into the free atmosphere, and leaves in it much more of what it brings up from the ground. While the house is heated during the cold season, and at night in the summer, while the air in-doors is warmer than the surrounding out-door air, the houses act as draught-flues, and suck air out from the ground as if they were cupping-glasses set over it. Experience has long taught us that it is most dangerous to sleep — that is, to pass the night — in such noted fever regions as the Pontine marshes. Many persons believe that the ground air is an object whose influence is still preëminently theoretical, and that its practical influence is exceedingly remote. It does not present itself in this light to the physician who has had to deal with it." The doctor quoted the following sketch given of an outbreak of cholera near Dantzic: "Nine houses stood in a group in front of the manor-house of the estate, and were inhabited by the farm-servants; seven of them had been rebuilt in timber, with brick fillings, and furnished with cellars which were perfectly dry; their ground floors were lined with deal and were dry, airy and kept clean; the manure-heaps were arranged in the manner that is common in the rural districts. Two of the houses in the group had not been rebuilt; they were old mud huts, with low stories, without cellars; the rooms were not boarded up, but only plastered; and their condition on the whole seemed much more unfavorable than that of the others, while the manner of living of their inhabitants, in other respects was in no way different from that of their neighbors in the modern cottages. About one hundred and fifty persons lived in all the nine houses. A woman suffering from an attack of cholera was taken into one of the new houses; three days afterward the first cases of sickness appeared in the neighborhood of this house, and the disease quickly spread to all the houses except the two old huts. The inmates of these houses had the same intercourse with their fellow-dwellers on the premises as the latter with each other; yet, while seventeen persons (or 15 per cent. of the whole number) in the seven new houses were prostrated, not a case of sickness occurred in the old huts. The exemption of the latter was attributed to their being isolated from the ground by means of their plastered floors. The change of the other cottages into modern dwellings, with exposed foundations, was hygienically a reformation for the worse."

It is evident from this that no ventilation will be complete which does not make provision for carrying away the air which will inevitable rise from the ground under a house.

HEALTH IN THE COUNTRY.

A few years ago the word country was the synonym of a place of mental and physical health. A farm-house well was regarded as a veritable fountain of youth. The air in the country was presumed by the residents of large towns to be chemically pure, with the exception of the odor of sweet flowers and of medicinal plants. To go into the country

was to find all the conditions most favorable to health, happiness and length of days. Country food, as served up in farm-houses, was regarded as superior to any drugs for freeing the system from disease in any form. Many city people believed that most of the deaths in the rural districts were the results of lightning, mowing-machine accidents, or old age. But opinions about the healthfulness of farm life and the sanitary conditions of most portions of the country have undergone a great change during the past few years. Many physicians, who have practiced in country and town, declare that the death-rate is larger and the causes of sickness more numerous in the former than in the latter. They state that all kinds of malarial diseases prevail in the country much more generally than in the city, and that dyspepsia, which is generally supposed to result from high living, is more common among persons who live and work on farms than among people of leisure in the city. It has lately been affirmed that the largest class of patients in our insane hospitals is composed of the wives of farmers. In short, there is strong evidence that a higher degree of both bodily and mental health exists among city people than among residents of the country. A physician of large experience in this city states that his services are always in active demand during the fall by those persons who have spent a considerable portion of the summer in the country. They contract diseases there and come home to obtain relief. They were disappointed about finding healing waters and purifying air.

Since the time the song of "The Old Oaken Bucket" was written, and perhaps for centuries before, people have believed that the open well, as found in the vicinity of most farm-houses, supplied water "the purest and sweetest that nature can yield." It is true that nearly all nature's springs and many wells afford very excellent water for drinking and culinary purposes. But it is also true that a very large proportion of the water consumed in the country is very bad. It would not be tolerated for supplying the inhabitants of a large city. In some cases it is taken from streams that contain all sorts of vegetable and animal impurities. In very many instances the water that falls from the roofs of buildings is conveyed through dirty troughs into wooden cisterns, where it is stored for the use of the family. It contains all the impurities of the air as well as those on the roof, in the troughs, and in the cistern itself. What is worse, it is constantly accumulating impurities in the place where it is stored. It becomes worse the longer it is kept. No filter, however good, can remove all the foreign substances it contains. It has a disagreeable color, flavor and smell. One long accustomed to the use of the water may not notice them, but they are apparent to persons who are in the habit of using water that is comparatively pure. Most wells that afford excellent drinking water are so carelessly managed that they become reservoirs of all kinds of filth. Vegetable matter of various sorts flows into them and becomes decomposed. Small animals and vermin fall into the wells and die, and as their decomposition is slow, their presence is not noticed for many months. When a farm well is cleaned out the beholder is generally nauseated at the mass of corruption he sees taken from it. Many wells are so situated that the filth of the barn-yard, the pig-sty, and even the privy itself, finds it way into them. The liquid from these places must flow somewhere, and as the well is the nearest outlet for drainage, it passes into it through the porous soil. Sometimes surface water, after heavy rains, flows into wells.

Some surface or open and underground drains are usually constructed on farms for the purpose of rendering soil more suitable for the production of crops. But it is extremely rare to find any drainage system undertaken for sanitary advantages. The water that flows from fields improved for cultivation is often allowed to accumulate in pools within a short distance of the house. There is nothing resembling a sewer in connection with the house, or the lot on which it stands. The water from the sink, as well as that in which the family washing is done, and all that employed in culinary operations, generally finds its way to the soil about the house. This soil becomes saturated with filth. It becomes full of the seeds of disease, which are ready to germinate as soon as the conditions are favorable. During the heat of summer, deadly vapors rise from it which are likely to pervade every room in the dwelling occupied by the family. In every direction are pools from which water only passes by the process of evaporation. There are also sluggish streams that have no perceptible current, except when the water is high. All these are nurseries of malaria.

The purity of the air in the country, like that of the water, is generally greatly overestimated. Many of the bad odors are disguised by the perfumes of apple and clover blossoms and numerous wild flowers. The vilest of odors are constantly rising from manure heaps, from the yards of barns and stables, and the inclosures where swine and poultry are kept. Animals and fowls that die on farms, in the highways, or on land that is not enclosed, frequently remain for weeks without being buried, for the reason that there is no person employed to look after and dispose of them. Many vegetables, like cabbages, potatoes and fruits, are left to decompose on the ground. The cellars under most farm-houses are manufacturers of poisonous vapors which ascend through the doors and cracks and enter every room in the dwelling. Country houses generally have no other means of ventilation than that afforded by the doors and windows, while the air in them is rendered foul by the vapors that arise from the wash-boilers and the dishes that are being cooked on the stove. Not one farm-house in a thousand contains a bath-room supplied with hot and cold water.

Most kinds of labor, as they are conducted on farms and in farm-houses, are not conducive to health. The work required in the field during summer is very hard, and is attended by almost constant exposure to the heat of the sun. During the season of haying and harvesting all work requires hurry and a certain amount of confusion. The rest that farmers receive is chiefly at the time when they can not work out of doors. They enjoy it so long a period at a time that it ceases to be enjoyable. They long for spring to come, as it affords occupation for the mind and hands. As to females who live on farms, they have no practical appreciation of rest. Their employment is drudgery. They have no amusements and few social opportunities. The food consumed in farm-houses is not generally conducive to health. Its quality is poor, and it is poorly cooked. It lacks in variety. It is largely composed of salt and smoked meats and dried fish. Most farmers have nothing but an

apology for a vegetable or fruit garden. An ice-house, or a fish-pond, on a farm is very rarely found. The sanitary condition of farms should receive more attention, especially when the settlers have the means to make suitable improvements. There should be drainage for health, as well as for profit. The water supply should be improved by the introduction of means for bringing it from springs and lakes, and carrying it where it is wanted in every house. More pains should be taken in disposing of manure, dead animals and decomposing vegetation. The matter of ventilating dwellings and cellars should receive more attention. When regard is paid to all these things the death-rate in the country will be lessened, and the general health of the people improved. W.

FOREIGN SUBSTANCES IN THE AIR.

The Master Plumbers of New York have inaugurated a course of lectures and entertainments for the winter. The first lecture was given at Steinway Hall last week by Prof. C. F. Chandler, President of the New York Board of Health. He took for his subject "The Air in its Relation to Health." The lecture was illustrated by stereopticon views, explanatory of the growth of fungi and bacteria, of bad plumbing, and of the proper system of plumbing now being enforced in that city. He referred to the constituents of the air, and with reference to the dust found in it said that examination of the dust which had collected upon the basement and higher windows of a Fifth avenue residence, showed that the dust upon the basement floor was composed chiefly of sand. The higher up he went the smaller grew the proportion of sand and the larger that of animal matter, so that the dust which blows into our faces is largely decomposing animal substance.

The refuse of the city pollutes the air, he continued. You have only to pass along any street to find more or less rubbish. That furnishes the nidus of the growth and development of these germs, and until we adopt better methods of getting rid of that refuse, we never shall have the air of this city in the condition that it should be. One of the most constant sources of the pollution of the air in inhabited localities, is the decomposition that takes place in the ground. Refuse of every kind gets into it. Our sewers are leaky, and putrefaction is constantly going on. The soil down to the limit of the ground water, contains a large amount of air. This air, when the atmospheric pressure in the house is diminished, is drawn in with such organic impurities as it contains. A cement floor in the cellar is not a protection against this entrance of the ground air, for the cement is porous to the passage of air, but a remedy may be found by laying on the cement a covering of coal tar pitch, in which bricks are set on edge, the spaces between the bricks are filled with the melted pitch, and the bricks then covered with coal tar pitch. When the house is being built, the foundation walls should also be similarly coated, outside as well as inside. Such a cellar floor was considered to be absolutely impervious to ground air and moisture. The lecturer had recently laid this floor in his own house with the greatest success. The atmosphere of the entire house is improved, and the expense is very moderate.

Another source of the contamination of the air of houses is the heating apparatus. Stoves and furnaces, however well constructed at first, will from the contraction and expansion of the metal, soon allow the escape of coal gas, and this danger is greatly increased by the use of dampers in the stove-pipe. When, to regulate the fire, the damper in the pipe is closed, the gases having their passage to the chimney cut off, will escape through any cracks or openings in the stove into the room. Prof. Chandler having kept a record of the accidents from this cause had accumulated a formidable list of suffocations due to the use of the damper. The danger was now somewhat lessened by providing dampers with perforations in the centre, which allowed the gases to escape when the damper was closed. As regards the maintenance of pure air in houses the preference was given to the open fire-place. The hot-air furnace deriving a supply of pure air from out of doors was, when properly constructed, a very satisfactory method of heating, but in city houses the mistake was often made of carrying the cold air duct of the furnace to the front of the house, where it was exposed to the dust of the streets. It should be taken from the rear end of the house, and carried some distance above the surface of the yard. It was an excellent expedient to insert in the cold air duct a wire screen to hold a layer of cotton to retain the floating impurities which might enter the air box. This could be removed from time to time and the cotton replaced. Steam heating has been objected to by many for reasons in no wise due to the apparatus, but to neglect in the use of it. The complaint of closeness where steam is used is due to the fact that a room containing a steam radiator can be heated with every door and window closed, and no fresh air is admitted, while with stoves and open fire-places a certain quantity of fresh air must be admitted to maintain the fire. Where radiators are used the ventilation of the room should therefore be looked after. Again, the complaint that steam apparatus has an unpleasant odor is due to the fact that the radiators are allowed to become covered with dust which is cooked, and gives rise to the smell complained of. The radiator should be from time to time cleaned. When these precautions are taken no means of heating is more satisfactory than steam.

Dr. Chandler described briefly the essentials of good plumbing, the necessity of a trap on the house drain, the ventilation of the soil-pipe and the ventilation of the trap against siphonage. Of the first he said that it offered protection to each householder against the entrance into his house of the germs of a contagious disease which passed into the common sewer from the house of a neighbor. Were the trap dispensed with, the contagion in the sewer would have free entrance into the houses connecting with it. The lecturer concluded by exhibiting specimens of bad plumbing, and gave it as his opinion that, with a properly constructed system of plumbing, placed in the house so as to be exposed to inspection, all danger from sewer-gas can be obviated.

THE SEWER-GAS QUESTION.

With a letter to *The New York Times* as a text *The Sanitary Engineer* discusses the sewer-gas question. The correspondent suggests that the waste of a house be collected in an iron tank in the basement, which could be emptied at regular intervals. He argues that the communication

with the sewer would thus be broken, and danger avoided. The reply is as follows:

The writer of this letter is evidently afflicted with a touch of the popular delusion about "sewer-gas." The fact is that in most modern cities where sewers exist the air in them is much better fitted for breathing without injury to health than that of most of the private house drains. It is true there is always this difference. The occupant of a house can control the condition of the drains within it, while he may not be able to control that of the public sewer, which is often contaminated by the diseased excreta of other houses. Still, if a man keeps his own drains in order, well supplied with fresh air and disconnected from the sewer by a ventilated trap, his house is virtually independent of the condition of the public sewers, and need suffer no damage from their neglect, except as they may affect the air of the public street. In this extreme case, which may possibly exist with neglected sewers at times of severe epidemics or pestilences, all the mechanical devices which human ingenuity can invent, including the one now proposed, will be of no avail. In fact, however specious such a tank with its stop-cock may appear, it is a step in the wrong direction. It violates one of the cardinal rules which should always be kept in sight and strictly enforced, like the brass tablets of law in the old Roman Capitol, viz.: to get rid of one's refuse as speedily as possible, and allow no accumulation of it to occur within one's house walls, even for a single hour, if possible to avoid it. In practice such a tank would be far worse in its influence on the household than an open connection of the house drain with the sewer without any trap. The tank could never be really cleansed as suggested, by any amount of automatic sprinkling from the water pipes. The grease would collect and cling like wax all around its sides and soon become putrid, while the sedimentary matters would adhere to the bottom with a like result. The only way to cleanse such a receptacle would be to send a man into it with scrapers and scrubbing tools, followed by washing down the whole interior with copperas water every day. Of course no family can be expected to follow up the matter in this way, for the labor involved would be more than that needed to remove all their refuse in pails and carts. The head of the family would find himself obliged to make frequent inspection of the inside of his tank in person, in order to insure its being properly cleansed.

But it is time that the public were disabused of the bugbear of sewer-gas as an omnipresent enemy to be fought by mustering an array of patent mechanical devices, and without the use of their own common sense. These devices, though many may be good in certain cases, are about as useful as a whole, when used without the most intelligent supervision, as the array of patent medicines we find advertised in our daily papers might be, if supplied in bulk to every family to be swallowed indiscriminately after every meal. Either method is about as efficient for good as the incantation of a gypsy crone, though unfortunately not as innocent. The inventors of all these "remedies," whether medicinal or mechanical, preface their advertisements with sensational descriptions of the terrible nature of the disease, hoping to create a nervous fear in the minds of the readers that they are already pining away with Bright's disease, or with sewer-gas as the case may be. Fortunately sensible men pay but little attention to these "wonderful cures." If they pay due attention to the laws of health they need but little medicine, and if they keep their own houses pure, they need pay but little regard to sewer-gas. They should remember that, with good, well-constructed sewers, such gases do not exist in the sewers at all. If they are found anywhere, it is more likely they would arise from some private drain, which by hoarding up filth in its crooks or corners, or by leakage under the basement floors, has brought the enemy within the easy reach of every man who informs himself, as he should do, at stated periods, of the proper condition of his own premises.

In short, if every man and woman looked after the cleanliness of their own houses in all their details, instead of getting nervous by reading advertisements of pretended cure-alls, whether in drainage or in medicine, we should have more wholesome houses as well as more healthy families.

OCTOBER MORTALITY IN CHICAGO.

The total number of deaths in Chicago during the month of October was 823. Of this number 20 resulted from cholera infantum; 16 from croup; 22 from diarrhea; dysentery, 8; diphtheria, 48; scarlet fever, 18; typhoid fever, 66; malarial fever, 9; measles, 2; small-pox, 14; whooping-cough, 8; delirium tremens, 1; cancer, 11; dropsy, 3; rheumatism, 3; apoplexy, 9; congestion of the brain, 10; paralysis, 10; heart disease, 11; asthma, 2; congestion of the lungs, 7; pneumonia, 30; Bright's disease, 11; accidents, 32; murder, 1; suicide, 11. There were 85 deaths in the Sixth ward, this being the highest number by wards. Of the number of deaths reported there were 432 males and 391 females; white, 811; colored, 12; married, 195; widows, 27; widowers 16. During the corresponding month in 1881, there 1,085 deaths.

COMING TO CHICAGO.

The Western Electric Light company has decided to bring its works from Indianapolis to Chicago, uniting them with their local factory. The foundation for a new factory will be put in this fall, and, if the season permits, the work will continue through the winter. With the exception of ninety-one feet at the corner of Van Buren street the buildings will occupy the entire front of the block bounded on the south by Congress street. The building to be commenced immediately will be as follows: On Clinton street 50x254 feet, with a wing on the north alley 58x100 feet. It will be pressed brick with bands of stone and weatherings, and ornaments of terra-cotta. With a view to preventing fires the company will build in the different parts of the building large fire-proof vaults, three on each floor, and each 12x16 feet, extending to the upper floors on one base at the bottom. These will be used for storage of valuable stock. All stairways and elevator shafts will be fire-proof. The boiler-house and stack will be built in the hollow square which it is intended will be the form of the building.

BUSINESS NOTICES.

J. B. Clow & Son have the largest business in furnishing sanitary supplies west of New York, and the extent of it in the west and northwest is equaled only by the great things which Chicago is capable of doing as a city.

Mr. E. Baggott has gained the reputation of doing square work, and he employs no man who does not understand plumbing and can not be depended upon to do a piece of work as perfectly when it is hidden as when exposed.

The Ruttan Manufacturing Co.'s system of heating and ventilation has stood the test of many years, and has crowded others out of very many public buildings. It is scientific and practical, and there is good reason why it should find its way more extensively into private buildings, as it has already into school buildings and public halls.

Messrs. Murray and Wade, West-side plumbers, can always be relied upon for good and economical work.

THE POOREST AND THE BEST PAVEMENT.

In a report to the city council of Detroit, Dr. O. W. Wight, health officer, protests, on sanitary grounds, against the use of wooden block pavements. Such blocks, he says, laid endwise, not only absorb water which dissolves out the albuminoid matter that acts as a putrefactive leaven, but also absorb filth of all kinds. The lower ends of the blocks, resting on boards, clay or sand, soon become covered with an abundant fungoid growth. Thoroughly saturated with albuminous extract and the excreta of animals in a liquid, putrescible form, wooden block pavements undergo a decomposition in the warm season and add to the unwholesomeness of the city. The streets might as well be covered a foot deep with rotting barnyard manure. The interstices between the blocks, and the perforations of decay, allow the foul liquids of the surface to flow through, supersaturating the earth beneath and constantly adding to the putrefying mass. The doctor is strongly in favor of the use of the Trinidad asphalt pavement. It contains no material that is acted on by the acid or alkaline solvents of liquid filth. It is tenacious, firm, durable, yet elastic and smooth. It is even less noisy than wooden block pavement. It costs less than stone for repairs, and next to stone lasts longest. It is comparatively impervious to liquids of any kind. It is free from dust and can be cleaned by water as easily as a China plate. The sheet asphalt can be adapted to an old pavement of stone or a macadam road-bed as well as to a special layer of hydraulic concrete. No other pavement can be so perfectly mended when cut into by plumbers. As 65 to 70 per cent. of sand enters into its composition, it affords a good footing for horses. It communicates no vibrations to adjoining buildings. It saves great cost of wear and tear to animals and vehicles. It makes so smooth a surface that street railroad companies could substitute on it Herdic coaches for street cars. The doctor has information from experts that asphalt could be made to stand the cold of our western winters. He is inclined to favor the use, in part, of hard-burned bricks, boiled in coal-tar. He has been shown a specimen which has been in use for nine years, with but little wear.

ENGLISH PLUMBING AND DRAINAGE.

The secretary of Her Majesty's Office of Works has prepared the following rules to be observed in the construction of all buildings erected in the Kingdom, under the control of the office:

1. All water-closets and urinals shall be constructed so that one wall at least of such closets and urinals shall be an outer wall building.

2. All soil-pipes shall be carried outside the building, and ventilated by means of pipes leading the foul gases above the highest point of the building, such pipes to be carried to points removed from chimney-stacks.

3. Separate cisterns shall be constructed for the water-closets and for the general purposes of the building. No tap or "draw-off" shall be affixed to any pipe communicating with a cistern supplying a water-closet or urinal.

4. All waste-pipes and overflow pipes of cisterns shall terminate in the open air, and be cut off from all direct communication with drains.

5. Great attention shall be paid to insuring thorough ventilation in all rooms. Rooms so high that their ceilings shall be more than two feet above the top of the windows, corridors, staircases and other open spaces shall be specially ventilated so as to prevent the accumulation of stagnant air.

6. All main drains should, where practicable, be formed outside the building. In the event of its being necessary to carry a main drain underneath a building it must be tapped immediately outside the main wall, and a ventilating pipe must be carried from that point to the highest part of the roof, as under Rule 2.

IMPROVEMENT IN ARCHITECTURE.

The improvement in architecture throughout the country is very noticeable. It is another mark of progress. Instead of the one-pattern houses of a few years ago, presenting unbroken front walls and stiff roof lines, we find in almost every village new houses that are attractive in design and pleasing in finish. There are fewer white houses, and the absence of glare is as restful as the architecture is suggestive of comfort. The idea that if one has the materials any sort of builder can put them together has been superseded to a great extent by the desire to have the design perfected, as the first step toward the new house. The belief that the services of an architect is a useless expense has often caused the waste of more material than would have paid the best of them. The material worked into the inconvenient and unattractive dwelling, in skillful hands, would have given the owner a pleasant place of abode. No surer sign can be found of the thrift of the people than the character of the buildings seen throughout the country. *The Builder and Woodworker.*

THE SANITARY ADVANTAGES OF HIGH LIVING.

At the recent English Sanitary Congress the Hon. F. A. Russell read a paper on "The Improvement of Climate at a Slight Elevation," which contained some statements of interest to the many dwellers in the upper stories of high buildings. "Recent observations," he said, "have completely disproved the rule, which only thirty or forty years ago was believed to represent facts, that temperature decreased regularly with increasing altitude. From results obtained at the various observing stations it has been found that a general agreement exists which proves that at points artificially or naturally raised above the surrounding district the range of temperature was smaller. At even a slight elevation it was not so cold in winter nor so hot in summer. It was found that at a height about equal to that of the upper rooms in a high house a more equable and drier climate prevailed than at lower levels, drier than at the seaside, and with a daily range not much greater, and much less cold on the coldest and on foggy nights than down below." The practical conclusions were that invalids and delicate persons should generally be placed in high, sheltered situations in the highest room of a house, and by no means on a ground floor; that a climate resembling that of the sea-side, but less damp, could be obtained by living at the top of a high house; that every house ought to be built on arches, or thoroughly ventilated below and raised on piers above the ground level; that no house or cottage which was not ventilated underneath with damp-proof walls should be considered habitable; and that, in the country, no house should be considered habitable of which the floor was on a level with or below the ground. Should such statements as these be made in New York, except upon the best authority, many persons would be ready to attribute them to the owners of some of our towering apartment houses, in the tops of which, according to this theory, invalids would enjoy all the benefits of the sea-side without any of its disadvantages; but Mr. Russell's statements in London are not open to this objection. In most of the large public hospitals in this city the upper story is the sitting and recreation room for convalescents, with a large number of windows and skylights, giving not only plenty of fresh air, but an abundance of sunlight. This is notably the case in the New York hospital, a very high building, where the parlors and play-rooms in the top story for patients are made attractive with flowers and ornaments. *The New York Times.*

CONSUMPTION CONTAGIOUS.

Dr. Bela Cogshall, of Flint, Mich., in a discussion of the question, "Is Tubercular Consumption a contagious and parasitic disease?" at the meeting of the American Public Health Association at Indianapolis, cited the results of experiments performed by distinguished physicians as demonstrating the affirmative, and gave some facts coming under his own observation. He said: "If it be so that consumption is a contagious disease, it behooves us as sanitarians to see to it that the great source of infection—the sputa of phthisical patients—is done away with by its immediate destruction, thus preventing the germs being wafted with the air promiscuously about, endangering the health and lives of nurses and attendants. We should also see to it that meat and milk infected with these parasites are not allowed to be eaten or become articles of commerce. Much can be done individually, but we need above all things in a matter of this kind necessary sanitary regulations. It seems to us we need enlightened sanitary legislation. The public health is involved, and its demands are absolute. There is no doubt but the traffic in this country in diseased meat and milk is quite extensive and calls for prohibitory legislation. We ought to have a vigilant board of sanitary inspectors in every State in the Union, authorized to act in every emergency. It seems to us that he who will carefully study and weigh these various experiments by such painstaking and eminent observers can but come to the conclusion that tubercular consumption is a contagious and parasitic disease—that it can be and has often been

communicated to other animals by direct inoculation, by food taken into the stomach, and by inhalation. It only remains to develop from the cultivated parasite tuberculosis in man as it has been by the natural tubercle as mentioned in this paper to complete the cycle of evidence and to establish this discovery among the greatest facts of medical science. We are aware that the past is strewn with wrecks of supposed discoveries which time has shown to be imaginary—still we shall hope for this all that is claimed. Although but few have been able to test this matter experimentally, yet many of us have seen striking cases in which it appeared evident the disease was communicated from person to person, sometimes taking several members out of the same family, and those who were not by any means subject to any hereditary taints."

WATER-SUPPLY IN VANDERBILT'S HOUSE.

Water is supplied to the new palatial residence of Cornelius Vanderbilt on Fifty-seventh street, New York, through a 3-inch iron pipe from Fifty seventh street, and through a 1½-inch lead pipe from Fifty-eighth street. The former connects with a brass pipe, three inches in diameter, inside the house walls, which conducts the water to the pumps. From the pipes the water is carried through a 2-inch pipe to a distributing reservoir on the fifth floor, just under the roof. The pumps are worked by a hot-air engine. The tank is made of wrought iron, riveted plates, and has the capacity of about thirteen hundred gallons. The overflow pipe is four inches in diameter, and connects directly with the sewer, but a very deep trap intervenes near the tank. To keep the trap constantly filled with water, a half-inch pipe is connected directly with the tank supply pipe. The overflow pipe is also ventilated below the trap by a 2-inch iron pipe which extends up through the roof. A copper float in the tank connects with a brass chain which extends down through a brass pipe to an indicator in the engineer's room. The bath-rooms and their fixtures on the various floors are arranged one above another, and the method of distributing the water to the bath rooms is as follows: In a passage way to the bath-room on the second floor, three sets of three pipes each come through the floor along the wall. One set is for cold water, another for hot water from the kitchen boiler supplied from the tank, and the third from the kitchen boiler supplied from the street pressure. The outside pipes of each set are connected with each other about three feet above the floor, and from the middle of this connection, with a stop-cock on each side, the third pipe of each set is taken to supply the bath-room fixtures directly opposite, the middle pipes being the distributors to that floor, and going no higher. The two hot water pipes, also, are connected, so that either source of hot water may be drawn from, as well as from either cold. The same method is repeated on the floor above, but the street pressure pipes go no higher. All the water-supply pipe in the house is of brass, tinned outside and inside, and all in sight above the cellar is nickel-plated.

HEALTH IN MICHIGAN.

For the twelve days ending with Nov. 9, diphtheria was reported in Michigan from twenty-five places, scarlet fever at nineteen, measles at two, and small-pox, one case each, at Niles and Grand Rapids. The prevailing diseases in the state for the week ending Nov. 4 was intermittent fever, bronchitis, neuralgia, rheumatism and consumption, following in the order named. For the month of October, influenza, bronchitis, diarrhœa, cholera infantum, dysentery and erysipelas were more prevalent, and remittent fever, diphtheria, intermittent fever, scarlet fever and whooping-cough less prevalent than the average for October in five years. The most noticeable decrease was in the communicable diseases most to be dreaded in Michigan.

PUBLICATIONS RECEIVED.

BOOKS.

"A Manual for the Congress with a Narrative of Past Labors and Results." By J. L. Clifford Smith, Secretary of the National Association for the promotion of Social Science. Published on the occasion of the twenty-fifth anniversary of the association, at the office of the association, 1 Adam street, Adelphi, W. C., London.

PAMPHLETS.

"First Annual Report of the Board of Health of Detroit." By O. W. Wight, M. D., Health Officer.

"Glycoscuria." By Oscar C. De Wolf, A. M., M. D., Professor of State Medical and Public Hygiene in Chicago Medical College. Reprinted from *The Boston Medical* and *Surgical Journal*.

"Laws Requiring Medical Men to Report Deaths and Cases of Infectious Diseases to the Public Authorities." Paper read before the American Public Health association at Indianapolis, October 19, 1882, by O. W. Wight, M. D., Health Officer of Detroit.

"Contributions from the Chemical Laboratory of the University of Michigan." By Albert B. Brescott, M. D., F. C. S., and Victor C. Vaughan, M. D., Ph. D. Vol. 1, Part 1. Reprinted from the August and September numbers of *The Physician and Surgeon*. Ann Arbor, Mich.

NOTES AND NEWS.

LIGHTING.

EDISON has perfected a meter for measuring the amount of electricity used in a given time, which is said to be absolutely perfect and certain. The light is sold by his company at the rate of 1 1-16 cents an hour for a ten-candle light.

THE Edison Electric Light Company has secured the right to light all the buildings of New York city with electricity, and preparations are being rapidly made to carry the plans laid out into operation. In one of the thirty districts into which the city has been divided there are already in position six immense dynamo machines, each run by a two-hundred horse-power engine. Each dynamo is capable of furnishing sufficient electricity to run fourteen hundred lights. It will be necessary to have six more machines to operate the entire district. Mr. Edison says that the feasibility of running electricity through wires laid underground has been thoroughly demonstrated, and he has no fears of the perfect working success of the scheme.

WATER-SUPPLY.

AN English chemist and engineer has shown that water which contained a small portion of the stools of patients that were sick with the typhoid fever caused the death of animals in a few days, though it had passed through a filter of the most approved pattern. A French authority states that the germs which are presumed to cause disease can pass through the best filter "thousands abreast." A good filter will stop the passage of large impurities which give color to the liquid, but will stop anything that is entirely soluble. His conclusion is that water which is not fit to drink before it is filtered is not healthy afterward. Experiments show that the operation of filtering often tends to make water more impure. The impurities that remain in the filter, being exposed to the action of the air, are oxidized, and are dissolved more readily. The mechanical action of the water in the filter also causes them to be dissolved. A filter filled with any sort of material becomes foul after a little time, and imparts a bad taste and smell to the water which passes through it.

FOOD ADULTERATIONS.

Of twenty-seven samples of candy chemically examined by Mary Dilworth, Ph. C., of West Chester, Penn., fifteen contained aniline. One specimen consisted entirely of aniline, terra alba and starch, sugar being wholly absent. Aniline was found in large amount in the cheaper candies, as the gum drops, and stick candy.

G. H. Palmer, Ph. C., of Bellefontaine, O., has made analyses of canned fruit at the chemical laboratory of the University of Michigan. Out of eleven samples all but four contained tin, a result of the action of the organic acids of the fruits upon the cans. He found it most abundant in the cans which were shop worn, indicating that old cans may reasonably be suspected of containing tin. He concluded that the presence of tin in canned fruit is general, though not to any great extent, yet that the constant absorption of this ingredient must have a deleterious effect upon the human system.

PLUMBING AND DRAINAGE.

A water-closet that will retain the water in the bowl to the desired height without a plug valve, or pan, has been patented by a gentleman of Kansas City, Mo. A side extension is connected with the bowl by an elbow, on the inner end of which a tilting valve is mounted that is so connected as to be tilted by raising the pull on the seat, permitting the water to flow through the elbow into the box and the waste-pipe. When the valve is closed the water in the bowl cannot flow out.

MISCELLANEOUS.

The firm of Hair & Odiorne, lumber dealers, on Twenty-second street, have failed. Their liabilities are said to be about $229,000, and their assets less than $200,000. Jesse Spalding, collector of customs, is the largest creditor. The firm did not deal in hard woods.

BOULOGNE is having a system of sewers constructed at a cost of $1,000,000. It is expected that the work will be completed next year. The sewage will be carried out to sea, beyond the harbor, which is itself being improved by dredging, at the joint expense of the French Government and the South Eastern Railway Company.

BUILDING INTELLIGENCE.

Among recent improvements are three dwellings for H. F. Waite on Astor street near Division street. Each will be three stories and basement, and the cost in total, $25,000. An apartment-house for E. Ernshaw, nearly completed, on Ontario street, east of Pine street, has accomodations for three families, each flat having ten rooms. It is in Queen Anne style and very conveniently designed. The cost will be $20,000. An apartment-house for S. B. Williams, on Locust street, near Wells street, with dimensions of 55x70 feet, four floors high, containing ten flats and costing $30,000, is being built.

Messrs. Treat & Foltz report the following improvements now being made under their supervision: On Ellis avenue, near Thirty-seventh street, three two-story and basement dwellings, each 22x60 feet, for W. G. and A. T. Ewing. They will be in pressed brick and terra-cotta trimmings. They will each contain seven rooms, and cost, together, $16,000; also, nearly completed, for Mary S. Kelley, three two story and basement dwellings, on Groveland Park avenue, near Thirtieth street, to cost $12,000; also for W. G. and A. T. Ewing, semi-detached brick dwellings on Thirteenth place, near Leavitt street, to cost $5,000 each. They have prepared for Frank Wells plans for a handsome brick house, 30x60 feet, in Groveland park. The facades are designed in good taste, in keeping with an excellently-planned interior. The cost is $9,000. They have recently completed the extensive improvements for N. K. Fairbank to his residence, corner of Michigan avenue and Eighteen street.

Messrs. Wheelock & Clay have designed a house for David G. Bradley, at Kenwood. It will show in the walls, brick, terra-cotta, and the new green serpentine stone quarried in Pennsylvania. The first story will be a compound of these materials, and the second will be in brick and slate. The style is the new English renaissance, having a broad gable, covering nearly the whole facade. At one side of the front will be the entrance, and at the west end of the house a porte cochere opposite the door which leads into the lobby of the main entrance. The structure will possess the merits of taste and originality. It will cost $20,000. It will be arranged on the inside on a plan as original as the exterior, and will be finished in different woods and made an elegant home.

The residence of B. P. Moulton on Prairie avenue, south of Twentieth street is about completed. It is in the style of the early French renaissance, and is faced on the three fronts—about 180 feet in total—with the finest selected Portland brown stone. The general dimensions are 44x90 feet, and the finish is carried throughout the four stories. Hard woods will be used for the entire first and second floors. The house is being wired for the Edison light, and will contain every convenience modern skill and domestic architecture can suggest. It will be completed about the first day of next September. The division of the house is into about twenty apartments, filling every possible requirement for a family mansion. The structure will cost $75,000.

The Abbott Buggy company will soon commence the following improvements between Seventy-sixth and Seventy-eighth streets, at the crossing of the Chicago and Western Indiana railroad: A building at the north end of the tract, which will be four stories high, in brick, and will cover 300 feet frontage on Seventy-sixth street and have a depth of 100 feet. At the south end, on Wallace, near Seventy-seventh street, a building four stories high, in brick, covering 200 feet by 60 feet. North of the above, and connecting with it by bridges at each floor, will be a building, 200x60 feet, in brick, and with the same number of floors. Besides the above there will be an engine-house and boiler-room. The buildings, ground, and extra machinery to be put in will, it is said, represent an investment of from $150,000 to $195,000.

Three two-story and basement dwellings, each 22x60, are being built on Ellis avenue, near Thirty-seventh street, for W. G. and A. T. Ewing. They will be in pressed brick and terra-cotta trimmings, costing together $16,000.

The following is a list of all new buildings in Chicago for which permits have been granted during the past two weeks, giving location, size, cost, and name of owner:

706, 18th st., 1-story cottage, 22x54. $2,000; J. Kinola.
760, 18th st., 2-story dwelling, 21x56, $3,000; John Jecel.
805 Clybourn ave., 1-story store, 22x40, $600; John Meischider.
Loomis st., near Polk, 1-story cottage, 25x26, $1,200; James McGuire.
137 California ave., 2-story flats, 22x50, $3,000; J. E. Pritchard.
3819 Vincennes ave., 1-story additional, 21x50, $1,000; D. H. Newton.
351 to 357 LaSalle ave., 75x62, $20,000; Charles Skeer.
790 W. Lake st., 1-story pavilion, 30x28, $1,500; M. Rohn.
708 Erie st., 2-story addition, 20x16, $700; George Dyan.
504 Indiana st., 3-story store and dwelling, 22x60, $10,000; P. Sullivan.
219 to 223, 18th st., 3-story factory, 72x100, $13,000; N. K. Fairbank.
174 Ontario st., 1-story cottage, 20x45, $1,200; F. W. Hoxman.
245 Rohey st., 2-story dwelling, 25x56, $7,000; E. G. Russell.
236 to 240 State st., repairs on 5-story store, 60x100, $10,000; F. R. Otis.
3364 Halsted st., 2-story store and dwelling, 25x70, $8,000; H. Wollner.
3204 Forest ave., 3 2-story dwelling, 50x40, $6,500; William Busby.
2500 Indiana ave., 2-story dwelling, 20x40, $4,000; S H. Curtis.
Hoyne ave., near Harrison st., 3 2-story dwelling, 54x50, $12,000; J. H. Loveday.
188 Winchester ave., 2-story dwelling, 22x56, $5,000; C. W. Shonk.
3634 Lake ave., 2-story barn, 35x25, $800; William C. Wheeler.
3737 to 3741 Ellis 3 2-story dwellings, 66x36, 24 and 33, $12,000; E. T. Ewing.
Indiana and Oakley sts., 1-story cottage, 26x26, $600; Willard Johnson.
Weed and Dayton sts., boiler house, 26x36, $2,000; Zanerle Manfg. Co,
Allport and 19th sts., 2-story store and dwelling, 20x50. $4,000; Vacla Horacek.
22nd st., near Loomis, 1-story store, 22x60, $1,500; R. Dalton.
Lincoln st., near Division, 1-story cottage, 21x44, $1,200; C. Hotlip.
Monroe and Clinton sts., 4-story factory, 98x100, $15,000, Roth, McMahon & Co.
722 Noble st., 2-story dwelling, 22x45, $1,000; Felix Pancek.
683 Center ave., 3-story store and dwelling, 21x70, $6,500; John McCarthy.
1245 Milwaukee ave., 3-story store and dwelling, 24x60, $6,000; Patrick Ahern.
14 to 19, 13th st., 2 1-story cottages, each 22x36, $2,000 John Gunzenhauser.
734 Morgan st., basement, 22x32, $1,000; Joseph Mattas.
161 Henry st., shop, 22x67, $1,000; Joseph Kral.
106 and 108 Dekoven st., basement, 48x90, $8,000; Bohemian Turner Society.
268 Taylor st., 2-story dwelling, 21x44, $3,500; Mrs. A. Jedlicha.
545 to 549 LaSalle ave., 3-story flats, 69x80, $20,000; D. Donegan.
Stearns st., 1-story cottage, 20x22, $500; F. Wesley.
286 Leavitt st., 2-story dwelling, 20x50, $3,500; J. S. Stewart.
127 Ambrose st., 1-story cottage, 20x32, $1,000; A. Walder.
Elm st., near State. 3-story dwellings, 50x50, $14,000; J. H. Dole.
Elm st., east of State, 3-story dwelling, 16x50, $5,000; H. W. Leman.
Elm st., east of State, 3-story dwelling, 16x50, $5,000; Vislet Gray.
Dixon st., near Blackhawk, 1-story cottage, 20x50, $1,000; J Batchere.
Honore st., near Jackson, 2-story dwelling, 20x60, $7,000; M. Weiner.
3056 Lock st., 1-story cottage, 20x32, $1,000; Aug. Schroder.
583 and 585 Sedgwick st., 2-story flats, 44x53, $5,000; D. Burns.
3443 and 3445 Indiana ave., 2-story dwelling, 33x48, $6,700; B. McNamara.
Osborne st., near Ohio, 2-story dwelling, 20½x45, $1,800; Henry McGarren.
Halsted st., south of 26th, 2-story store and dwelling, 24x80, $6,000; M. McDermott.
LaSalle st., near 35th, 1-story cottage, 20x32, $1,000; F. Pollach.
9 Whiting st., 2 story store and dwelling, 29x50, $3,000; Thomas Cullerton.
562 to 567 N. Halsted st., 3-story store and dwelling, 38x60, $7,000; J. Jerusalem.
2536 Halsted st., 2-story dwelling, 22x52, $4,000; D. Cosly.
18th and Brown sts., 4-story paint factory, 142x60, $20,000; Carey, Ogden & Parker.
525 Garfield ave., 2-story dwelling, 36x42, $5,000; O. Vider.
Dudley st., near Iowa, 2 1-story cottages, 20x30, $2,000; H. & C. Viderok.
Fisk and 22nd sts., 2-story addition and repairs, 44x30, $12,000; Goss & Phillips Manfg. Co.
726 to 730 Washington boul., 3 2-story dwellings, 60x44, $27,000; M. M. Kirkman.
662 W. Adams st., 2-story dwelling, 23x43, $6,300; S. Rothschild.
500 to 507 Ogden ave., 2 3-story stores and dwellings, 42x52, $10,500; P. T. Dodge.
598 Laflin st., 1-story cottage, 20x30, $600; James Kinney.
229 to 237 W. Harrison st., 3 3-story stores and dwellings, 100x60, $20,000; Mrs. Mary Keller.
3516 Wentworth ave. 1-story cottage, 20x25, $1,000; John Opfor.
Elizabeth nr. North, 3-story dwelling, 30x70, $10,000; Elizabeth H. North.
18 Rice st., basement, 22x44, $1,100; E. Sykes.
53 and 55 Wells st., 2-story store and dwelling, 40x60, $4,800; Smith & Copelin.
13th and Oakley sts., 12 2-story dwellings, each 20x38, $25,000; A. T. Ewing.
Noble st., basement. 18x43, $700; John Rich.
135 Samuel st., 1-story cottage, 20x30, $600; John Bredle.
76 LeMoyne st., 2-story dwelling, 20x32, $1,800; J. H. Hansen.
DeKalb st, near Polk, 1-story cottage, 20x40, $1,200; Mrs. Brahamy.
272 and 274 Sedgwick st., 1-story store, 47x70, $3,500; C. F. Gross.
3133 to 3147 Parnell st., 1-story cottage, 20x30, $2,200; J. Sexton.
26th and Murry sts., 2-story dwelling, 22x46, $5,000; Henry F. Sheridan.
1314 Jackson st., 2-story dwelling, 22x44, $4,500; Robert C. Hosper.
213 S. Sangamon st., 2-story dwelling, 23x42, $3,000; John Fortune.
94 Sedgwick st., 3-story dwelling, 22x82, $6,000; C. A. Hollander.
2259 Butterfield st., 1-story cottage, 22x40, $1,000; Chas. Pulham.
658 Dixon st., 2-story store and dwelling, 21x54. $2,400; M. Loskie.
3543 Dearborn st., 2-story dwelling, 21x50, $3,500; Toolen & Maloney.
153 and 155 S. Wood st., 3-story flats, 53x61. $8,000; D. L. Pinkney.
2943 Wentworth ave., 3-story store and dwelling, 24x62, $6,000; John Moeller.
1176 Milwaukee ave., 3-story store and flats, 25x80, $8,000; James Sokup.
583 N. Wood st., basement 20x56, $1,600; M. Kobitz.
3016 Michigan ave., 2-story barn, 22x32, $1.700; W. Wightman.
Ellis ave., south of 37th st., 2 2-story dwellings, $8,000; George Trumbull.
609 Center ave., 2-story store and dwelling, 24x70, $4.000; S. Rabbitt.
266 E. Huron st., 4-story flats, 28x88, $18.000; E. B. Sheldon.
108 S. Peoria st., 3-story flats, 21x50, $4,000; C. Baldwin.
171 Jane st., 1-story cottage, 22x34, $1,000; Au ust Brand.
3821 Dearborn st., 1-story cottage, 22x50, $1,800; J J. Raser.
33 Keenan st., 1-story cottage, 20x32, $700; John Thompson.
Washington and Francisco sts., 2-story dwelling, 28x50, $6,000; M. A. Richardson.
779 Allport st., 1-story addition, 23x75, $1,000; V. Horacek.
20 W. Van Buren st., 24x33, $1,100; H. Debus.
274, 24th st., basement, 20x34, $700; C. Eck.
389 Elston ave., 1-story barn, $500; C. W. Crouse.
107 and 109 Wabash ave., 1-story store, 40x160, $30,000; P. E. Studebaker.
S. Wood st., north of Taylor, 6 2-story dwellings, 126x47, $20,000; Rodney Dennis.
54 and 56 Lincoln ave., 2 3-story dwelling, 42x60; $15.000; William Schmidt.
117 Laflin st., 2-story dwelling, 29x40, $2,400; John Galligan.
37th and Tucker sts., 1-story cottage, 20x30, $700; P. Shaughnessy.

The Sanitary News.

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CONTENTS.

THE ILLUSTRATIONS 25
CURRENT TOPICS:
- Pure Air and the Public Health 25
- Death Rates as Affected by Surroundings 25
- Architecture and General Culture 26
- The Careless Use of House-drains 26
- Results of Official House Inspections 26
- Competition in the Manufacture of Gas 26
- The Vaccination of Emigrants 27
- Pneumatic Drainage 27
- Facilities for Extinguishing Fires 27

IMMIGRANT INSPECTION SERVICE 28
SANITARY ENGINEERING 28
THE FUTURE OF GAS 29
AN ELEGANT COUNTRY RESIDENCE 30
THE PROPAGATION OF VACCINE VIRUS 32
CHICAGO DRESSED BEEF 33
THE VIRTUES OF CARBOLIC ACID 33
RULES FOR HOUSE DRAINAGE 33
FILTH AS A CAUSE OF DISEASE 34
MEDIÆVAL FILTH 34
OCTOBER MORTALITY IN CHICAGO 34
MALARIA IN ITALY 35
SANITARY CONDITION OF THE JAIL 35
NOTES AND NEWS 35
BUILDING INTELLIGENCE 35

THE SANITARY NEWS publishes in this number an illustration of the elegant summer residence of Mr. and Mrs. W. C. Larned, at Lake Forest, Ill., together with a sectional view showing the system of drainage in use. In connection with these illustrations is one showing for the first time a new and improved automatic flush-tank, invented by Benezette Williams, of this city. There will be published, hereafter, in consecutive numbers, illustrations of other new buildings in and about Chicago, whose architectural or sanitary features are worthy of notice.

IN the course of his recent address before the Sanitary Institute of Great Britain, Captain Douglas Galton devoted considerable time to the consideration of the effects produced on public health by pure air and ventilation. M. M. Davy, of the Montsouris Observatory, Paris, has found that the air in crowded places and near sewer-openings contains more bacteria germs than the air outside the city, and he has also proved that there are fewer of these elements of life in rainy and in very dry periods. In winter, too, the number is at a minimum, and at a maximum in autumn. Little beyond the fact of their plentiful existence is known of these organisms, but it is reasonable to assume that they are not all of the same character and that they produce different effects upon the higher forms of life, some resulting in disease, and others being innocuous. It is even supposed that there may be varieties capable of useful assimilation by complex organisms. It is found that there is a striking correlation between the more or less plentiful development of this elementary life, under certain conditions of climate and atmosphere, as already carefully observed, and the prevalence of those diseases which recent investigations show to be the visible result of this noxious energy In hot climates these relations are especially evident, and in the military statistics of the British army at home, a very striking instance is given of the reduction that can be effected in mortality by a reduction in the quantity of germs. Not many years ago, when sanitation was little understood or heeded, the deaths from tubercular disease amounted to 10 per 1,000; that is the present percentage of deaths from all causes in the army at home. Now, the number of deaths from this particular malady is 3 per 1,000, a satisfactory proof of the results attending the removal of germs from the air of the barracks and hospitals; for, as Professor Tyndall has recently shown, tubercular disease is one of those dependent upon, and propagated by, the existence and development of living organisms. Air and water are the media for the passive existence of these beings, and for their transmission to congenial soil, and in every instance the removal of causes favorable to their development is followed by a diminution of disease and death. In towns and villages where ignorance and indifference combine to encourage the one, the other follows as a necessary result. In various parts of London, old, ill-ventilated, and unsanitary houses, in which the rate of mortality was as high as 50 per 1,000, have been removed, and in their place improved dwellings have been erected. A special feature of the more recent of these tenement-houses is the provision of ample space around them for the free circulation of air and unobstructed ventilation. In these the rate of mortality has sunk to 13 in the 1,000.

THE conclusion to be drawn from the experience obtained and investigations carried out, and to which Captain Galton called especial attention, was that by proper attention to sanitation the death-rate among the lower classes of city populations may be reduced to 15 or 16 per 1,000. It is very truly pointed out that "a low standard for the mean duration of life in the wages-earning class is not a necessity. It is controllable by surroundings in which they live, and the fact of how largely the death-rate is influenced by their surroundings is evidenced by the condition of health in improved industrial dwellings." In London the death-rate taken over a series of years in the butldings of the Metropolitan Association for Improving the Dwellings of the Laboring Classes has varied from 14 to 17 per 1,000, and in those of the Improved Industrial Dwellings Company they have been during a term of thirteen years 16.2 per 1,000. In Newcastle similar results are obtained: For the year ending June of 1882 mortality in improved dwellings has been only 12 per 1,000; while that

for the rest of the city was 21 per 1,000. During the five years ending June, 1882, nearly twenty thousand prisoners passed through the prison at Newcastle-on-Tyne, and although there were during this period epidemics of scarlatina, typhus and small-pox in the town, no deaths arose from either of these causes. The deaths among these prisoners, exclusive of those suffering from disease when admitted, was, in 1881, only .021. But it is needless to multiply instances of the results of neglect of sanitary laws, or of the consequences of obedience to them; they are now well known, and their application is growing year by year of wider extent, with, among other beneficial consequences, that of insensibly leading the lower classes to the appreciation of a higher condition of physical life. The work remaining to be done is almost incalculable, and the average of human life must, for many years to come, remain at an unnecessarily low figure; but in our day in this city epidemics such as those which have ravaged London in the past are practically impossible.

Mr. W. L. B. Jenney, architect, is delivering a course of lectures on Wednesday evenings at the Chicago University, on "The History of Architecture as a Part of General Culture." These lectures are open to the public, who are showing their appreciation of them by crowding the hall to hear them. The next lecture will be given at 8 o'clock on the evening of December 6, and the subject will be "Grecian Architecture."

The evils attending house drainage are not always to be charged to the plumber and drain-layer. A few days ago a leading architect was summoned to the residence of one of his patrons on the South side. The complaint was that the air which came up through the registers had suddenly become charged with the foulest odor. The architect immediately caused an examination to be made. The house was one of the best in the city. It had been well built, and so recently that defects in the drainage could hardly be expected. The basement floor rested upon a bed of solid concrete, under which was the cold-air flue leading to the furnace, built of brick. It did not take long to find that this flue was filling with house sewage. The main drain had been clogged at the outside running trap by the ravelings of an old hammock which an attendant about the premises had carelessly thrown into a water-closet. They had passed the trap under the closet, but lodged in the outer trap. The sewage was forced back in the pipes and filled the catch-basin. It went still further back through the open tile drain which was laid under the concrete to carry off surface water. This ran near the cold-air flue, and the contents were readily forced through the porous walls of the flue. This was fortunate, as it led to the early discovery of the trouble; otherwise, the soil might have become saturated with the sewage. A similar circumstance is related by the same architect. Last summer he was summoned to another house, the inmates of which had been annoyed by bad odors. He found that the outer trap was choked by the remnants of a bouquet, the wires around which had held back the coarser matter in the sewage until the pipe was completely clogged. A lady of the house had thoughtlessly thrown the withered bouquet into a water-closet on her return from the theater one night. These circumstances are practical suggestions that the use of a drainage system can be abused as well as that of anything else. Drains are made for a special purpose, and so long as they are required to serve no other, they are, when rightly constructed, a boon. As in these instances, so in hundreds of others the defects in drainage are largely, or mainly, the result of the thoughtless or ignorant use of them. There is as good reason for knowing that drains were not made to carry off the remnants of hammocks and old clothes, hoop-skirts and withered bouquets, as that the basement of a house is not built for a stable.

A summary of the reports of the inspectors in the sanitary department of the Health office from week to week would make startling chapters. Defective drains and sickness and death are almost invariably mentioned as constant companions. In a two-story brick house on West Ohio street, built about three years ago, an inspector found an open surface basin in the basement, connected directly with the main drain without any pretense of a trap. The sewer air was circulating through the house. A young lady had recently died in the house and several of the remaining members of the family were seriously ill. The inspector sought out the man who did the work, and found him employed in duplicating the job in a new building in the neighborhood. He is still at large, probably, engaged in setting a death-trap in somebody else's house. A complaint came to the department from the suffering occupants of a house on South Oakley street. Foul odors were found emanating from a dark closet. The floor was torn up and there was exposed an unused soil-pipe, the unsealed end of which was simply covered with a small piece of carpet and a shingle. Whether the soil-pipe had been put in for future use, and carelessly left open, or a formerly-used closet had been removed from it, could not be learned. The waste of a two-story frame house on North Ann street was found to be conducted through untrapped pipes to wooden boxes, which in turn emptied into a large hogshead, that answered the purposes of a cesspool. The inspector speaks of it in mild terms as "very filthy and thus detrimental to health, but also dangerous, lest children should fall into it and be drowned." Six inches of sewage were found under a two-story frame house on West Indiana street, in which several of the children were sick.

The Consumers' Gas, Fuel and Light Company, chartered in April last, has begun active operations in the erection of its buildings. The company will occupy the entire block bounded by McGregor, Twenty-fifth, Hanover and Butler streets. The first two buildings will be 115 x 60 and 150 x 45 feet, respectively, in size. There will also be an office building 60 x 30 feet, and two stories high. The gas-holders will be surrounded by brick structures to prevent annoyance in the immediate surroundings from escaping gas. The gas will be manufactured according to the Lowe water-gas process, and the works will have a capacity of two million feet a day. The company has an authorized capital of $500,000. In the spring a sufficient force will be set to work to lay one mile of pipe daily. By the conditions of its charter the company cannot charge more than

$1.75 a thousand feet for its gas. The plan of tunneling the river to connect with the West and North divisions is being considered. It is expected that one hundred miles of street mains will be laid next summer. Several car-loads of the pipe are already on the ground. This enterprise is an important one to Chicago. The present gas companies have a monopoly, each in its own division of the city, and the quality of the gas which they furnish is, at times, inferior, and prices to consumers are simply exorbitant. A man has to pay just what they see fit to charge him, and the charges seldom have the least reference to the amount of the article consumed. The result has been that the tradesman and householder of moderate means have quite generally substituted the use of oil. The new company claims that it will be able to furnish gas of a superior quality.

Dr. John H. Rauch, secretary of the Western Immigrant Inspection service, says that he has been informed by the former surgeon of an immigrant steamer that it is the usual custom of steamship surgeons to get a large supply of vaccine virus at one time, and use of it till gone, however long. He says they often use virus several months old. Old and inert lymph is furnished by the wholesale druggist at reduced figures. The inspection on shipboard is done hurriedly, and it is seldom that any pains are taken to see all. Not unfrequently the protection cards are given on the word of the immigrant himself, without the doctor's taking the trouble to see either the arm or the certificate of vaccination. It is quite time that the rights of the west were respected in this matter of sending unprotected and infected immigrants across the country. Steamship companies and coast cities have the same moral right to scatter poison broadcast. The facts presented in the monthly report of Dr. Rauch, an abstract of which is given on another page, should lead to something more than indignation.

Notwithstanding they give careful attention to sanitary matters in the old world they seem to have a bungling way of putting their ideas into practice. A system of pneumatic drainage has been devised at Lyons, France, which cannot be compared for feasibility with that at Pullman, Chicago's new and model suburb, a complete description of which has been given in The Sanitary News. It is now in working order at barracks where a thousand soldiers are quartered. Underneath the closets the old cesspool has been emptied, thoroughly cleaned, and converted into a cellar. From each closet above, a pipe communicates with an iron cylinder or drum. Within this first receptacle there is an iron basket which will retain a hard substance, such as a brush, or even an infant if thrown down the drain. As a commendation, it is claimed that the detection of crime is thus facilitated, and the obstruction of pipes rendered impossible. A portable handle, affixed from the outside, is used about once a week to impart a strong rotary motion to this basket; the presence of any hard substance is then detected by the sound, and any accumulation of softer substances macerated and driven out. From this first receptacle, and by natural gravitation, the liquefied sewage flows into a second iron receptacle placed close at hand—within a yard or so. A large ovoid floater occupies the greater part of the space within, the pointed end fitting hermetically an opening at the bottom, where the pneumatic suction keeps the floater in its place. It is not till the receptacle is almost full of water that the floater is able to disengage itself from this suction, and rising enables the sewage to escape by passing under the floater into the pipes, where the pneumatic suction carries it away. This suction is produced by a steam engine situated in the suburb of Lerallois-Perret, and the iron pipes, placed within the main sewers, communicate not only with the barracks, but with several private houses, and with a depot at the Place de La Concorde, where the contents of many cess-pools are brought and emptied. The total distance is 4,600 metres. It is claimed that the apparatus has worked well and great stress is laid on the fact that sewer-gas cannot enter the house, being drawn away by the suction in the pipes. It would seem, however, that the iron basket and the second iron receptacle must become great nuisances. To keep them clean and thus prevent the generation of gases as dangerous as those which come from the sewer would necessitate a daily scrubbing — mere flushing would not do. No system of drainage can be considered practical and safe that does not at once remove all sewage from the house, and from the city, or town, even. It is proposed to place the Lyons apparatus under all the houses of Paris; to draw by pneumatic action all the sewage to depots in the open country and there pump it forward from ten to fifty miles, where it may be used either to irrigate farms, or be precipitated and converted into a fertilizer.

A new automatic stand-pipe and water-tower for the use of the fire department of this city, has been invented by Assistant Marshal Petrie and Foreman Ashworth. An exhibition was given last week. With one hundred pounds pressure, water was thrown 225 feet. The apparatus was raised and put into operation in less than five minutes; but it is expected that with practice, it can be hoisted in half that time, or even less. The object of it is to bring the nozzle of the hose on a level with the upper windows of high buildings, so that water can be directed into a room horizontally; and, also, to bring the firemen into closer relations with a fire. The apparatus consists of a continuous pipe, which is divided into three sections, and which opens out like a telescope. An internal screw-threaded shaft, which receives motion through bevel-gear wheels at the base, raises the second section, and a long screw-threaded sieve within this raises the third section. The whole lies in a horizontal position when not in use. The pipe can be turned in any direction when vertical. The apparatus will be stationed temporarily in the Exposition Building, and manned by details from the truck companies until the city shall provide for its separate maintenance. It can be readily converted into a fire escape, by attaching a basket to the upper end of the pipe, and persons caught in the upper stories of a burning building be taken away with safety. This invention ought to prove of great value, as many of the heaviest losses from fire occur through the inability of the firemen to direct their hose to good advantage. Portions of a building are often deluged with water, to the serious damage of goods, ceilings and walls, while a trifling amount of water in the right place would put an end to a fire which would be likely to develop into great proportions.

IMMIGRANT INSPECTION SERVICE.

The report of Dr. John H. Rauch, supervising inspector of the Western district of the Immigrant Inspection service, during the month of October, to the National Board of Health, shows how the steamship companies and the authorities in eastern cities disregard the interests of the west. Of the immigrants arriving in the district during the month, 16,473 were inspected by the assistant inspectors, who found 3,353, or about one-fifth of the whole number, whom they deemed it desirable to vaccinate or revaccinate. Among these were 350 who had never been vaccinated at all, and these included an unusually large number of adults. Of the total number, 4,728, or nearly 30 per cent, were susceptible on landing; but 1,364 of these were vaccinated or revaccinated by eastern inspectors before arriving in the Western district. If this proportion holds good with the total number of immigrants arriving in the country, then only a little over one-third of the susceptible are properly protected in the Eastern inspection districts. This may be due to the reduction in the number of inspectors last month, but it is also probable that the inspectors pay more attention to the immigrants who settle down in their respective districts, and only vaccinate as many of those going beyond their boundaries as they find time and opportunity for. No unprotected immigrant, the report continues, should be landed. Where a port refuses to adopt such a regulation, it is probable that sufficient pressure may be brought to bear upon the steamers, through the railroad companies, to secure the desired end. To do this it would require that state and local boards of health should charge the railroad companies with the expense of vaccination, as well as of the care of the infected brought by them, and of disinfection, etc. If it were understood that such expense, as well as the delay, interference with the movements of trains, and other annoyances, could be obviated by securing from the steamers compliance with so obviously reasonable a requirement, it can not be doubted but that the railroad companies have sufficient influence to obtain such compliance. This roundabout method of dealing with the steamship companies would, of course, be unnecessary, were maritime quarantines based on approved sanitary principles and administered in the interests of the whole country, rather than that of a port or section. In too many instances immigrants are hurried through such ports with only so much of an inspection as apparently serves to protect the port itself from the actual presence of contagious disease. There would be nothing onerous in the requirement above suggested, for if the steamship companies would unite in refusing to carry unprotected immigrants, intending passengers would secure protection before applying for passage. Failing to do this, the ship's surgeon has usually time and opportunity enough during each voyage in which to examine every passenger and properly to vaccinate those requiring it.

As the matter now stands, at the end of the fifth month of this service, there are manifest inequalities in the work, both as to kind and quantity, alike of the steamship surgeons afloat and the inspectors of the service on shore. Some of the former do not even go through the form of inspecting their passengers; others merely inspect and furnish cards, but without vaccinating; still others vaccinate only unvaccinated children, and pay no regard to adults, no matter how remote the date of their original vaccination. Some of the steamship companies which furnish cards to their passengers, omit the name of the company, of the steamer and of the surgeon—in short, furnish no clue to their identity. Dr. Rauch thinks that many of the present difficulties can only be overcome by enforcing the inspections and the necessary precautions without regard to delays and detentions.

During the month seven cases of small-pox were removed from trains. As the weather grows colder and the days shorter, more care is required to keep railroad cars in a cleanly condition, and properly ventilated. The inspectors note from time to time some laxity in this respect, even upon the best managed roads; but the evil seems to be most marked in cars transferred from other lines to our trunk lines. For example, one inspector, speaking of a train on the Pittsburgh, Ft. Wayne and Chicago railroad, says: "It had two cars of the New York, Pennsylvania and Ohio railroad, and ninety-three immigrants. It was said that the cars had been brought to Mansfield, O., attached to a freight train, but of this I have no knowledge, personally. The cars were dirty, and water closets had bad odor. The people did not seem to be up to the average lot of immigrants in physical, social or personal condition. I found it necessary to revaccinate forty-one, and to vaccinate three." Another one says: "Two cars from the Great Western, on one of the trains of the Michigan Central railroad, presented a marked contrast with the cars of this company used in the immigrant transportation. They were filthy and absolutely without illumination, although they arrived several hours after dark. In a car on the Indiana, Bloomington and Western railroad, the Indianapolis inspector found the body of a girl, 12 years of age, who had died of diphtheria the day previous. The mother said that the child had been sick from the time of landing in New York. The inspector had the body disinfected, and removed in an air-tight coffin, the clothing destroyed, the car emptied, cleansed and disinfected, and the immigrants placed in a clean car and sent on their journey. The inspector on the Baltimore and Ohio railroad, on the 21st of October, found a Scandinavian woman who had given birth to a child about two hours before his arrival. She was almost moribund. As she was too weak to continue her journey, he had her suitably cared for on arrival in Chicago. One inspector notes the arrival of a woman by the Cunard steamer Samaria, bound for California, who presented symptoms "suspiciously like those of leprosy."

SANITARY ENGINEERING.

The inaugural address of Captain Douglas Galton, C. B., at the late meeting at Newcastle of the Sanitary Institute of Great Britain, was a valuable contribution to the literature of hygienic science. He said that to the well-known saying that "dirt is only matter in the wrong place," may be added another, that disease, and death itself, is but life in the wrong place. The phenomena of fermentation and putrefaction have been shown to be due to the presence of almost infinite and ever-present numbers of germs of elementary life, ready to spring into activity under favorable conditions, and to develop those phases of vital energy known to us as fermentation and putrefaction, and

which in some of their indefinitely numerous varieties assume forms of disease in the lower animals and in man, such as typhoid, cholera, tubercular disease, diphtheria, malarial fever, etc. The minuteness, number, and rapidity of reproduction of these — to the higher forms of life — fatal organisms entirely pass beyond our powers of conception, as is illustrated by the famous experiment of Pasteur. This physicist discovered that if the point of a needle be dipped in the blood of a fowl suffering from chicken cholera, and the minute portion thus removed be transferred to pure chicken soup kept free from contamination by air-borne germs, that after a short time the solution becomes turbid with the mass of organisms developed, and if a minute portion be removed in the same way with the point of the needle and transferred as before to another solution, the same process is repeated with a similar result. In this way a hundred generations of "microbes" may be reproduced, and if fowls be inoculated with, or caused to swallow, a small quantity of the last solution, the disease is at once developed in all its original force. Time, however, plays an important part in this experiment. If the solution containing the germs be kept for a period of weeks or months, the conditions of vital energy are so far changed that the inoculation produces far less violent consequences, diminishing with the length of time the solution has been kept. The very interesting experiment, made by M. Gustave Le Bon, illustrating another phase of the same phenomena of these obscure forms of life has been reported by THE SANITARY NEWS. These two experiments appear to illustrate some of the great and constant dangers to which human life is exposed by disease. The infinite number of vital germs, their easy reproduction, their sustained vitality through long series of generations, their undiminished energy so destructive to the higher forms of life, their easy transmission, reception, and assimilation by the system, are all indicated in Pasteur's wonderful experiment. On the other hand, the gradual change that takes place in the energy of a mixture charged with bacteria, not free to reproduce beyond the restricted limit in which they are first developed, is shown in M. Le Bon's experiment. In this latter, the emanations, whether they be new forms of life developed from the extinct bacteria, or only chemical compounds, contain the fatal elements, while the residual and once deadly mixture becomes harmless. Inevitably these invisible but powerful agencies are always at work destroying vitality, or rather converting that form of it with which we are most familiar into other combinations of matter and energy, which after a long series of changes may assume again the condition of motion inherent and inseparable from the phenomenon of life, and so on in an apparently ceaseless round. Sometimes, as with Pasteur's chicken broth, the germs, after completing their destructive work in one organism, are transferred in their descendants to another, developing typhoid, cholera, and other epidemics in those persons who offer suitable elements for their development and extension. Sometimes, as in Le Bon's experiment, the more apparently active germs having disappeared, the subtler but equally sure elements of destruction are disseminated, and may develop malarial fever or other diseases such as may be induced by breathing the emanations from old cesspools or sewage-impregnated soil.

As it is the duty of the physicist and physician to investigate the causes, and endeavor to combat the results of the too frequent encounters with their invisible foe, so it is the work of the engineer to remove as far as possible all facilities for the reproduction and dissemination of the germs, by insuring a constant and ample supply of pure water and pure air. We have a powerful ally in this perpetual struggle. It is not in every organism that the bacteria finds a congenial resting-place, and nature is a rapid and never-tiring purifier, converting the dangerous energy of this form of life to other and more neutral phases. Crowded centers afford the most striking illustration of what can be done both in the way of developing disease-generating germs, and also in destroying them or averting their effects as shown by the death statistics of cities under varying conditions of sanitary efficiency. Thus in London the death-rate during the five years following 1868 was 27.0; during the same number of years ending in 1881 it was 23, and last year it was only 21.7. The city of Munich offers, perhaps, the most striking illustration of the effects of sanitary efficiency. Between 1854 and 1859, when there was a total absence of all attempts at sanitation, the death-rate from enteric fever was 24.2; from 1860 to 1865, when the porous sides of cesspools were cemented to stop the filtration of sewage into the ground, it was reduced to 16.8; from 1866 to 1873, when the drainage system was partly complete, it was 13.3, and by 1880, when the works were complete, it had sunk to 8.7. In the same way the statistics of many other cities might be adduced to show the results which follow the prompt removal of sewage, instead of allowing it to remain and develop into active energy the latent forms of elementary life with which it teems.

The rapidly-increasing knowledge now being acquired as to the causes of a large range of diseases, our better acquaintance with those mysterious elementary organisms which depend for life upon the death of higher developments, should lead, not perhaps to a suppression of their existence, but to some sort of control over them: but certainly to a modification of their nature and influence. Already Pasteur, Tyndall, and others have opened a new path for medicine to advance upon, and when once the pioneers of science have advanced in any direction it is impossible to hazard a guess, in these days of rapid progress, how far they will go or when they will stop. There is a vast field for exploration in this invisible world of vital energy, the lowest, so far as we now know, in the scale of development, but which nevertheless plays a most important part in relation to the highest phase of life.

PROF. SIEMENS believes that the time is not far distant when both rich and poor will largely resort to gas as the most convenient, the cleanest, and the cheapest of heating agents, and when raw coal will be seen only at the colliery or the gas works. In all cases where the town to be supplied is within, say, thirty miles of the colliery, the gas works may with advantage be planted at the mouth, or, still better, at the bottom of the pit, whereby all haulage of fuel would be avoided, and the gas in its ascent from the bottom of the colliery, would acquire an onward pressure sufficient probably to impel it to its destination.

Residence of Mr. and Mrs. W. C. Larned. W. L. B. Jenney, Chicago, Architect.

BLAIR LODGE.

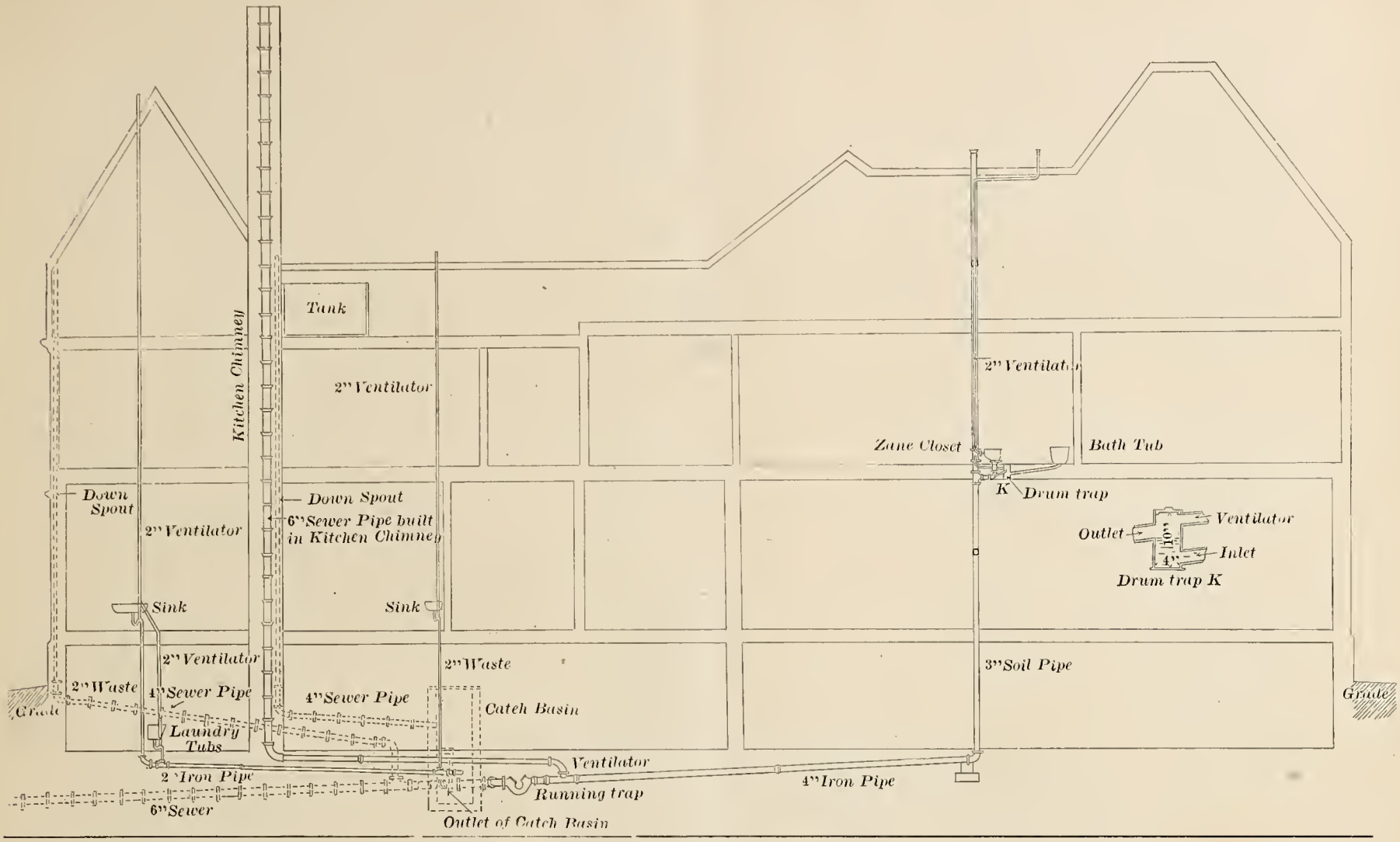
LAKE FOREST, ILL. LAWN FRONT.

AN ELEGANT COUNTRY RESIDENCE.

The elegant country residence of Mr. W. C. Larned, an illustration of which is given above, is located at Lake Forest, a northern suburb of Chicago. It stands 125 feet from the edge of the bluff which overlooks Lake Michigan, at a height of 65 feet. The building was begun in October, 1880, and was occupied in the following August. It was erected from designs by and under the supervision of Mr. W. L. B. Jenney, architect, and cost $97,326. The building is two stories high, with basement and attic, and is 112x64 feet in size, exclusive of porches. The basement is built of Lemont stone, and the walls of the upper portion of brick. There are two 8-inch walls for the first story with a 2-inch air-space between them. For the second story a wall 4 inches thick is built between the supporting posts, back of which is a sheeting and 4-inch studding. The brick used is of buff color and was manufactured at Highland Park from superior clay. It is red tuck-pointed. The roof is of slate. The interior finish is in hard woods. The painting and decorations are in olive green, olive brown, etc. The floors are of white oak, with wax finish, except in the kitchen, which is of maple. There are two fronts, the lawn and the lake front; the former is shown in the illustration, the lake appearing beyond.

The interior arrangements are as follows: On the first floor are the parlor, with south front; the dining-room, looking out upon the lake; a smoking-room at the northwest corner; two guest chambers, with south fronts; a large octagonal hall, opening on both fronts of the building; a butler's pantry, kitchen, servants' dining-room, scullery, two toilet-rooms and tennis-room. On the second floor, with south front, are a family-room, nursery and chamber; on the east front, dressing-room, family-room, linen-room, nurse's room and two bath-rooms, and in the north pavilion are guest chambers and a large chamber at the northwest corner. All these rooms are large and well lighted. The main hall is finished in white oak, the parlor in bird's-eye maple, the smoking-room in birch, and the dining-room in cherry and mahogany. The rooms of the second story are finished in Georgia pine. The basement is used for laundry, the furnaces and storage, and the attic for servants' rooms, gymnasium and children's play-rooms.

The illustration on page 31 shows the system of drainage in the house, although it is to be understood that all the parts are not represented. The principle is correctly shown, however. The plumbing arrangements on the first floor include two water-closets, with accompanying baths and basins, besides the fixtures of a toilet-room under the stairs, and sinks in the butler's pantry and kitchen. The waste-pipes are all ventilated, as shown in the illustration. On the second floor there are two water-closets with baths and basins. The entire system is cut off from the flush-tank and catch-basins by a trap, and is ventilated by a sewer-pipe flue built in the chimney. The pipes are all of wrought-iron with steam-fitting joints, except that under ground, which is of cast-iron, up to its connection with the tile drains. The entire system is supported on piers independent of the walls of the house, so that any settling of the walls cannot affect it. The water-closets, too, rest upon



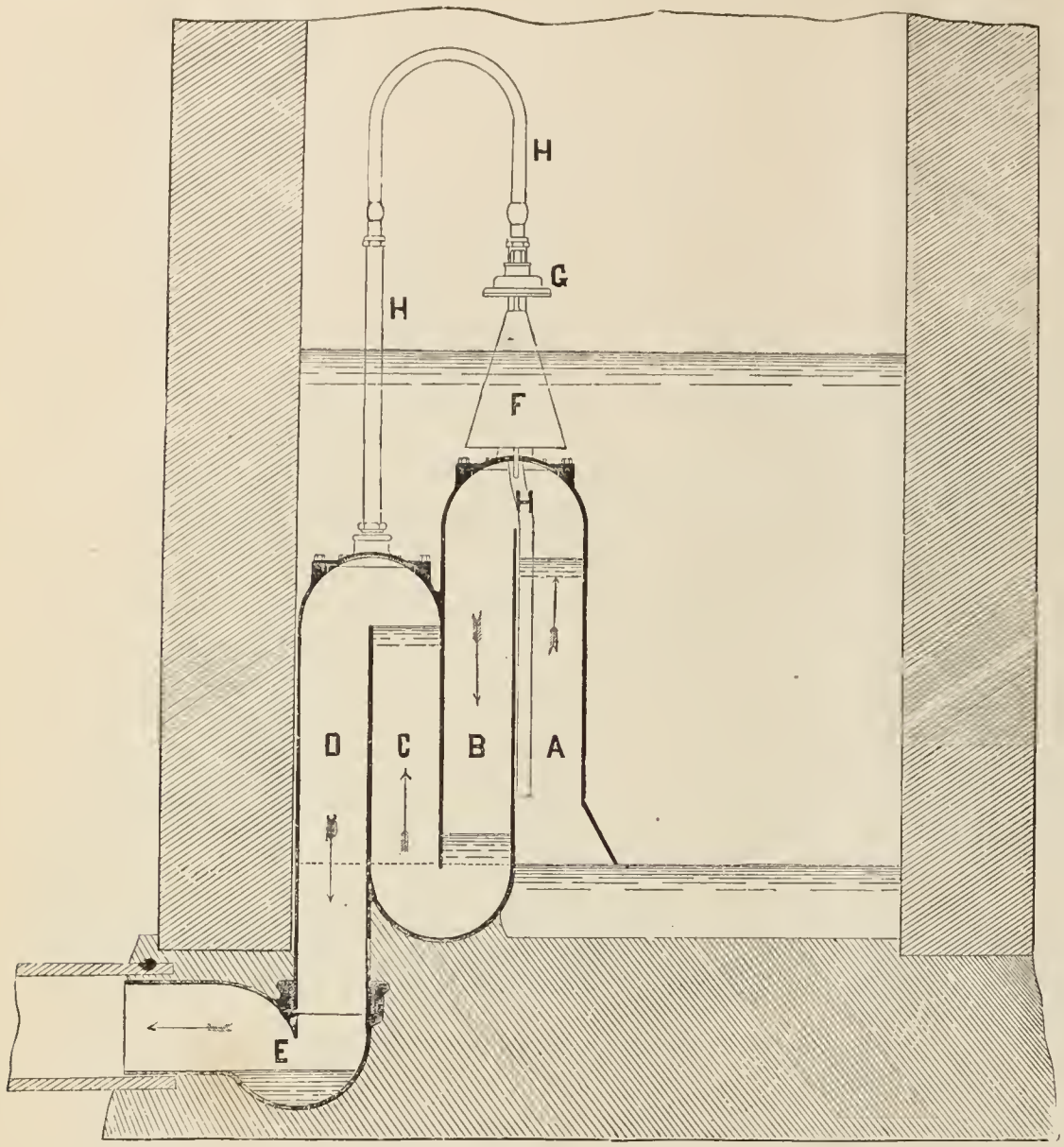
System of house drainage in use.

BLAIR LODGE.

LAKE FOREST, ILL. SECTIONAL VIEW.

strong iron branches, and not upon the floors, hence there can be none of the ordinary difficulty about the separation of joints caused by unequal settling. The building is heated by two hot-air furnaces, the registers being placed in the floor, and the cold-air ducts leading in from the west and south, the air being taken from grade. There are grates in all the living and sleeping rooms, and it is through these that ventilation is secured. There is also a grand old-style fire-place in the large hall for burning logs. The ground under and about the house is thoroughly under-drained. The water supply is obtained from an artesian well about 600 feet in front of the house and about 700 feet deep. It flows a 3-inch stream, and supplies the grounds and other buildings, as well as the house. For house use the water is pumped by one of Ericsson's caloric engines, placed in the basement, to a tank in the attic, which has a capacity of about 800 gallons. The house is lighted by gas, which is manufactured on the grounds and stored in a tank about 100 feet from the house. The hot-air engine is set in motion by heat generated from a burning gas-jet, and is thus always ready for service at slight expense.

The entire sewage of the house is disposed of through Benezette Williams' automatic flush tank, an illustration of which is given on page 32. The siphon is both intermittent and automatic in its action. The reservoir, on being filled to the upper water line shown, is emptied by the siphon in a few seconds to the lower line, no further discharge occurring until the reservoir has been again filled. This action of the siphon can be understood by reference to the illustration. The two limbs C and B form a deep trap, which, if containing sufficient water, makes a seal between A and D. As the water rises in the reservoir it also rises in the limb A. As soon as it reaches the lower end of the small pipe H, which extends down within a few inches of the bottom of A, the air in the upper part of A and B is confined, and as the water in the reservoir rises still higher it is compressed, at the same time forcing the water down in the limb B and up in the limb C. This action continues until the water has reached the highest point in the reservoir, at which time it has the position in A, B and C as shown. The compressed air confined between the water in A and B is liberated by means of a small valve, G, operated by the float F, thus allowing the water to flow in and fill the siphon, including the limb D. By this time the partial trap E has been fully sealed, thus causing a discharge with a head equal to the difference of height between E and the surface of the water in the reservoir. The reservoir is quickly emptied to its lowest point, when the admission of air checks the flow, causing the trap E to unseal and air to be admitted freely at E, and in turn through the pipe H H to the limb A. An equilibrium is thus restored and the siphon is ready for the reservoir to be again filled. As the sewage leaves the tank it passes into a system of drain-tile pipes arranged on a hill-side, and through which it escapes and soaks into the ground. The flush tank has proved to work with perfect success, and by its use the ordinary accumulation of grease in the catch-basin is prevented and the cesspool made unnecessary.



WILLIAMS' AUTOMATIC FLUSH TANK.

THE PROPAGATION OF VACCINE VIRUS.

The health authorities and physicians in the west have been subjected to much inconvenience in the past, at times, in securing fresh and reliable vaccine virus. In fact, there have been occasions when that which was either good or bad could not be had. This is a matter of more than ordinary importance. Although vaccination has its opponents and some men will face the danger attending small-pox, and subject their families to it rather than be vaccinated, it is almost an established axiom among the best physicians and intelligent people that vaccination does prevent the offensive and fatal disease; and it is demonstrated that there need be no danger attending the operation. In spite of protests, the ocean steamship companies bring emigrants to this country who have not been thus protected, and in almost utter disregard of the wishes and pleas of the west, the authorities in eastern cities hurry the immigrants out of their own cities, again without vaccination, except so far as to protect themselves. The result is that Chicago particularly of western cities is in constant danger. Sickness from small-pox among newly-arriving immigrants is no uncommon thing, and when they locate they are continually spreading the infection. It is important in this connection to know that the largest establishment for the propagation of vaccine virus in the world has just been established at Englewood, an immediate southern suburb of Chicago—more definitely, at the corner of Wallace and Sixty-third streets. It is a combination of the two establishments of Dr. E. L. Griffin, at Fond du Lac, Wis., and Dr. J. Pettet, of Cleveland, and will hereafter be known as the National Union Vaccine Company. Operations were begun only a few days ago, but they will be pushed to meet any possible demand. The virus will be propagated in the usual way in carefully selected young heifers, but a new method of preserving the virus will be used. It is well known that vaccine soon loses its protective properties if left exposed to the air and subject to the changes of temperature and humidity. Extra precaution is sometimes taken in double-dipping the points, but even then the length of time during which they can be preserved is only slightly increased. The company has constructed a cooling and drying room in the building, in which it is expected that the material can be stored and lose none of its efficiency for a considerable length of time. This cooler is lined with galvanized iron, between which and the outer walls are air spaces, and above which is a large reservoir for ice. It is expected that the cool air will descend on one side of the room and, as it becomes warmed, ascend on the other side, become again cooled and continue thus to circulate. The room is closed by an air-tight double door. The drying is hastened by dry chloride of calcium. The demand for virus is not steady; people do not think of vaccination until a small-pox epidemic approaches and then all want to be protected at once. No establishment can always produce fresh points on demand. Time is needed; hence it is important that there should be means for preserving them.

The new establishment at Englewood will be conducted after superior methods. Such establishments are usually spoken of as vaccine farms, but in this case the "farm" consists of two acres of ground only. On this are two buildings, one a receiving barn and the other a structure of six or eight rooms, which is as well finished as most residences. The latter is 45x66 feet in size, and contains two operating-rooms, one packing room, the cooling and drying room, and two stables for the sick and convalescent animals, besides a reception room, feed room and loft for storage purposes. All the rooms have a hard-oil finish, even to the floors and stanchions of the stables. The cattle are fed on baked corn and oats, ground, which has been first cooked by steam. Each animal is kept on hand about four weeks, when it is disposed of, uninjured, for stock, dairy, or any other purpose. Besides the use of good stock, ample means are provided for the heating and ventilation of the building. The capacity of the establishment will be sufficient, it is said, to meet any emergency. Both parties interested in the business devote their whole time to this work, and they state that they propose to produce a quality of bovine virus which shall command the confidence of the medical profession and the public.

THE Hammond Library building, adjoining the Union Park Congregational church, and connected with the Northwestern Theological Seminary, is about completed. The building was the $30,000 gift of Col. Hammond.

CHICAGO DRESSED BEEF.

Now and then the daily papers get up a sensation over alleged slaughtering of diseased and maimed cattle and hogs at the Stock Yards, the dressed meat of which is to be used for shipping or home consumption. The New York dailies encourage the public in believing these sensational stories, just because the business of local butchers is now being seriously injured by the importation of Chicago dressed beef. To get an official statement of facts, *The Sanitary Engineer* very sensibly addressed a letter of inquiry to Dr. DeWolf, Commissioner of Health in this city. He made the following statement in reply:

1. No shipper can afford to pay railroad charges on sick or emaciated animals. If such animals reach the Stock Yards, it is the result of accident en route.

2. The carcasses of animals trampled upon or severely injured in transportation and brought to the Chicago Stock Yards, and all animals found sick are turned over to the Union Rendering Company, for rendering purposes. If an animal is injured in unloading, it is immediately slaughtered, and the carcass is put into our local markets. No packer would purchase such an animal or permit it to be brought to his premises.

3. There has been no season since 1877, when so few sick cattle have appeared at the yards, or the general character of the stock, both as to grade and condition, so high as the present Fall.

4. This department can not exercise police power in stock inspection at the Stock Yards; they are located outside the city limits; but I am invited by the Stock Yard authorities to keep an inspector on duty there for the purpose of inspecting cattle intended for our local markets. Every aid and facility is afforded this inspector by the Stock Yard officers, for it is in the interest of this corporation that an animal or carcass, unfit for food, should be condemned at the Yards, rather than after it has reached the city. If condemned at the Yards, the Union Rendering Company (which is a Stock Yard corporation), gets the carcass, while if it reaches the city market, and is then condemned, it passes to other hands. In spite of this Stock Yard inspection, about 800,000 pounds of various meats have been condemned this year in our local markets, and transferred to the rendering tanks, always under the personal supervision of the inspectors, who have police power.

5. It is sometimes intimated in the public press that packers of preserved meats in cans, and houses engaged in forwarding fresh meats from the Yards in refrigerator cars, are careless in the selection of animals for slaughter. This is a mistake. This class of meat is selected by the most experienced buyers and judges of stock, for neglect in this matter of purchasing a sound and salable material would ruin the business.

THE VIRTUES OF CARBOLIC ACID.

The reason why carbolic acid is so efficacious in many diseases, as well as in the dressing of wounds, is plain. Molding, fermentation, decay, the souring of milk, the suppuration of wounds, and the propagation of certain diseases are all due to the same cause,—to the presence of the germs of certain fungus plants. The air we breathe is full of such vegetable germs; every breeze sows them broadcast, and every organic substance which is at all moist, offers a soil for their growth and development. Myriads are sown everywhere; some of them take root and grow in one substance, some in another; those which do not find the peculiar nutriment they need perish. It was for a long time supposed that the same germ produced different organisms when deposited in different fluids,—that the mold on an old boot, the fermentation in a jar of preserves, the change of grape-juice into wine, and of wine into vinegar, were merely manifestations of the same living organisms under different conditions; but the exhaustive researches of Pasteur have proved that the stern law which was impressed upon the vegetable world when it came into being, that each was to bear seed "after his kind," is as inexorably true of the organisms which elude all but the most penetrating micro-copic power as it is of the mighty forest oaks and gigantic mountain pines. The true explanation of the phenomenon was that the air sowed all kinds of seed everywhere, but that these only sprang up where they found congenial soil. The wind-sowed germs falling upon the surface of bread, or cheese, or sweetmeats, grow into airy forests of pearls and emeralds and topazes which we, with our coarse vision and rude classification, contemptuously name mold.

If, instead of falling on the surface of preserves, the air gets mixed through them, when it finally escapes it leaves the tiny germs behind. If these could find no oxygen, they would as surely be smothered and die as an insect would under the same circumstances; but the fungus has a resource which the superior insects lack. They can manufacture their oxygen out of the sugar in the syrup. Sugar is a compound of several substances, among others, of oxygen. When this oxygen is removed, there is no longer the compound sugar, but there remains some alcohol and other things. The preserves, if the process goes on long enough, lose their sweetness; they have the "tang" of alcoholic spirits in their taste, as well as the acidity which is the absence of sugar. It is not the air which hurts canned goods, but the germs that the air carries with it. When air is perfectly filtered, milk, meat, fruit—anything, no matter how delicate—may be exposed to it for a year or more, and they will not suffer any deterioration.

Decay is an analogous process. Certain germs live and grow at the expense of the substance in which they have been sowed; the substance is thrown out of equilibrium, and we call it popularly "decayed," or "spoiled." An open wound offers just the nutritious garden-spot suitable for the development of certain germs, which are always in the air; they grow, taking out of the living blood some element necessary to its healthy equilibrium, and the blood becomes diseased. Nature attempts to resist this invasion, to restore the balance, and, in the attempt to throw off the diseased particles, suppuration ensues.

Carbolic acid is deadly to these germs. When it is sprayed upon an open wound, all the germs which have found their way into it are destroyed. The curative process becomes very much simplified. It is merely the healing over of torn nerves aud muscles and skin. The work of nature is direct; she has no enemy with which to contend at each step in repairing damages. The other domestic uses of carbolic acid are due to this germ-destroying power. It is used as an antiseptic in cases of typhoid fever, which is a disease of the alimentary canal, and is propagated by germs. It is applied to correct any possible invasion of sewer-gas, whose poison is due to the presence of germs. In cases of small-pox, or virulent chicken-pox, the greatest relief to the pain and soreness and irritation may be found in bathing the patient frequently in hot water with carbolic soap, and then annointing the body with a mixture of glycerine and carbolic acid in the proportions of sixty drops, or a teaspoonful of glycerine to one drop of strong carbolic acid.

During the Franco-German war, a remedy in the case of wounds and certain contagious diseases was much used, which is now being introduced into this country under the name of phenol-sodique. Phenol is only another name for carbolic acid, and this preparation is only more valuable for domestic purposes because it has a uniform and known strength, which it is impossible to get with any certainty in carbolic acid.

It must be borne in mind that carbolic acid is a virulent poison from its corrosive power. In case of accident from swallowing it, olive oil, taken in large quantities, is the proper antidote.

S. B. H. in *The Century.*

RULES FOR HOUSE DRAINAGE.

Complaint is made at the sewerage department of this city that attention is not always given to the rules and regulations of the department for laying house drains and constructing private sewers. It is stated that inspectors repeatedly find the drainage of a building in process of construction in direct violation of these rules; the result is that the work must be done again at increased expense and at a loss of much good feeling. The essential rules and regulations are as follows:

1. Each and every house must make direct connection with the main sewer in the street. Under no circumstances will two or more houses be allowed to make such connection through one pipe, nor to carry their drainage in pipes laid beneath or through adjoining property.

2. The construction of private catch-basins outside the lot lines, in the public streets, or inside the area of building walls, will not be permitted, except in isolated instances where their location in the vaults beneath the sidewalks may be found to improve the sanitary surroundings, or assist the house drainage.

3. Privy vaults can be only connected with the sewers through intervening receiving basins, and the outlet pipes from all such vaults must not be less than three feet above their bottoms, so as to retain all

solid matter, and effectually prevent anything but the liquid contents of the vaults from passing into the drainage pipes and catch-basins. All discharge pipes leading from kitchen sinks, or any other receptacles likely to contain grease in any form, shall make direct connection with and discharge their contents into catch-basins; and all bath-tubs, water-closets, hand basins, stationary washing tubs, etc., shall connect direct with the soil-pipe, or main drain.

4. No sewer pipe trap will be permitted at the foot of a ventilating shaft, or soil-pipe.

5. The least inclination that can be allowed for water-closet, kitchen, and all other drains not over six inches in diameter liable to receive solid substances, is one-half inch in two feet, and for cellar and other drains to receive water only, one-quarter inch in two feet. All drains must be laid at a grade of not more than one-half inch in two feet between the sewers and the sidewalks, the grade to be continued from the sidewalk or curb wall to all connecting catch-basins, at one-half inch in two feet, unless written permission is first obtained from the owner to raise such grade.

6. All pipes whose ends are left open to facilitate the drainage of cellars, areas, gardens, yards, etc., shall terminate in the side of a circular catch-basin constructed in brick masonry, not less than three feet interior diameter, the bottom of which must not be less than three feet below the bottom end of the outlet pipe. All connections between the main sewers and slaughtering-houses, lard-rendering establishments, butcher-shops, packing-houses, hotels, restaurants, manufacturing establishments, etc., shall be made through intervening catch-basins, built in brick masonry, and whose number, dimension and form, shall be prescribed by the Superintendent of the Sewerage Department. Whenever a drain pipe is connected with a temporary catch-basin for draining excavations made for the foundations of buildings, or for any other purpose, the open ends of all such pipes shall be covered with some form of screen, and the drain-layer will be held strictly responsible for all expense that may be incurred for removing sand, gravel or earth, from the main sewers.

7. All pipes shall be laid fair and true to line, and upon foundations of assured stability, either natural or artificial, and the ends of each length of pipe shall abut squarely against the adjoining pieces, so as to present an absolute continuity and uniformity in the interior of the drain, particularly at the bottom line. The joint rings shall be carefully placed in position, concentrically around the pipes, the space between the latter and the rings thoroughly flushed with mortar, and finally, as the work progresses, and each length of pipe is permanently fixed in place, the interior shall be thoroughly cleansed and wiped out, and all projecting mortar or other substance carefully removed, so that the internal area of the drain shall be left absolutely unobstructed, smooth and clean throughout its entire length, any changes in the alignment of the pipes in any direction to be made on true curves, with curved pipe.

8. After the work has been finished and properly inspected, the back-filling shall commence without delay, and during its prosecution, and as fast as deposited in the trench, it shall be thoroughly puddled and tamped to such an extent as to render subsequent settlement of the surface practically impossible. The drain-layer will be held strictly responsible for any disturbance or displacement to the roadway ballasting or paving, due to his neglect faithfully to conform to the foregoing requirements.

9. All mortar used in the construction of house drains, private sewers, catch-basins, or other fixtures pertaining to house drainage, shall be composed of one part pure hydraulic cement powder thoroughly incorporated with one part of clean, sharp lake shore sand mixed with clean water, and fresh made for the work in hand. Whenever the use of grout may be necessary, it shall be composed of pure cement powder and clean water. All concrete shall be composed of one part pure cement powder, two parts clean, sharp sand, or fine washed gravel and three parts crushed stone, broken bricks or quarry chips, the mortar being made first, the stones or bricks then added and the whole immediately deposited in place in layers not over ten inches deep at a time, and then tamped until the water of admixture is flushed to the surface.

10. All pipe used shall be straight, smooth and sound, thoroughly burned. vitrified and salt-glazed, free from lumps or other imperfections. All straight pipe shall be straight in the direction of its natural axis, and its interior and exterior surface shall be concentric. All pipe shall be made with butt joints, square and at right angles with the axis, and each piece of pipe shall be furnished with a "sleeve" or "ring," not less than four inches wide, and whose internal diameter is at least one and one-half inches greater than the external diameter of the pipe to be encircled and joined. All curves, slants, or junctions shall conform to all the foregoing requirements as regards quality, form, and workmanship, and in general their thickness shall be equal to that of the pipes of the same calibre into which they are to be worked or jointed.

11. All house drains connecting the main sewer with the catch-basin, and all branches connecting with water-closets and sinks, shall be not less than six inches internal diameter. For connections with down-spouts or hand-basins only, four-inch pipe will be permitted when preferred.

FILTH AS A CAUSE OF DISEASE.

The opinions of physicians as to the influence of filth in generating disease, are quite as varied as those of non-professional men. Whoever is right, all sensible people are quite likely to agree that it had better be kept out of sight and out of presence. Dr. H. Gibbons, Sr., in *The Pacific Medical and Surgical Journal*, says: The specific poison of infectious and contagious diseases has no odor. It may be associated with offensive odors, or it may not. In by far the larger proportion of instances it is not. Offensive odors cause no permanent disease. They may excite nausea or transient disturbances of digestion, or they may lower the standard of health by long exposure. Certain emanations offensive to the smell, notably if sulphur be the basis, tend to destroy organic germs. Water which has been polluted by excrementitious or other organic matter, is mostly drank with impunity, the gastric juice digesting or destroying the organic germs. The production of disease by such water is the exception and not the rule. Polluted water becomes purified by agitation in the streams, by filtration in the earth, and by a spontaneous fermentation.

MEDIÆVAL FILTH.

In the thirteenth and fourteenth centuries, epidemics, which lasted from one to three years, occurred in the borough of Newcastle, England. In the time of James I, so little regard was had to cleanliness, that the "dunghill" within the castle precincts "had increased to such a size and bigness that it was in length 98 yards, the depth of it was 10 yards, and the breadth of it 32 yards," some 27,000 tons of filth having thus been allowed to accumulate. In the seventeenth century the great plague was one of the eleven epidemics; it alone caused seven thousand deaths, and it led, by the almost complete desertion of the town and port, to a ruined trade and wasted treasury. Even in 1853, at the date of the then prevailing cholera epidemic, it is reported that the town so abounded in narrow yards, lanes and "entries," that in one district alone there were streets exceeding a mile in length, which had an average width of some four feet only. Since then rapid progress has been made, and although much remains to be done, yet the reduction of the yearly death rate per thousand by ten in as many years, and the diminution in the same time of typhus to one-fifth of its prevalence in the period immediately before, are matters of congratulation and tangible results of good work effected.

OCTOBER MORTALITY IN CHICAGO.

The total mortality in the city of Chicago during the month of October was 823. Of these 389 were under 5 years of age; 241, under 1 year; from 1 to 2 years, 66; 2 to 3, 30; 3 to 4, 18; 4 to 5, 34; 5 to 10, 48; 10 to 20, 46; 20 to 30, 84; 30 to 40, 72; 40 to 50, 65; 50 to 60, 40; 60 to 70, 40; 70 to 80, 23; 80 to 90, 11; 90 to 100, 2; unknown, 3. By wards, the deaths were as follows. First, 6; Second, 24; Third, 25; Fourth, 30; Fifth, 70; Sixth, 85; Seventh, 45; Eight, 42; Ninth, 12; Tenth, 24; Eleventh, 16; Twelfth, 27; Thirteenth, 33; Fourteenth, 99; Fifteenth, 55; Sixteenth, 4; Seventeenth, 36; Eighteenth, 18; public institutions, 95; by violence, 41. During the same month in 1881 the mortality was 1085; in October, 1880, 766; in September this year it was 1085. The deaths from the zymotic diseases during October, 1882, were as follows: Small-pox, 14; measles, 2; scarlatina, 18; diphtheria, 48; croup, 16; pertussis, 8; typhoid fever, 66; cerebro-spinal fever, 7; malarial fever, 10; diarrhœal diseases, 77; other zymotic diseases, 42; total, 308. The deaths from consumption numbered 68; acute lung diseases, 59.

MALARIA IN ITALY.

In Italy has been published the first part of a large map designed to illustrate the prevalence of malaria in that country. It is shown by this map that out of sixty Italian provinces only six are entirely exempt from the disease. These are Genoa, Porto Maurizio, Florence, Massa and Carrara, Pesaro, and Piacenza. Two principal causes of the scourge are the marshes produced by the excavations of the railways, leaving a want of a good outflow for the water, and the destruction of the forests. Practical means for improvement are advocated by Signor Torelli, who insists upon the prevention of the accumulation of stagnant water by correcting and taking systematic care of the mouths of rivers, canals, drainage, automatic cataracts, embankments, wells, and plantations; most of which means, it is urged, will be at the same time serviceable in preventing inundations such as those that have lately devastated large districts. It is said that there are in the Italian hospitals every year some 12,000 patients suffering from malaria, and that out of the 2,200 men employed on the Sicilian railway alone, 1,455 have been attacked in a single year.

SANITARY CONDITION OF THE JAIL.

The present grand jury is considering the sanitary condition of the North Side Court-House in this city. Dr. De Wolf, Health Commissioner, is foreman, and it is probable that he will bring the facts at his disposal to the attention of his fellow jurors. In his charge to the jury Judge Gardner said: "It has got to be a custom for the grand jury to visit the jail, at the close of their labors, look over the same, and report it clean and well-kept. The report is doubtless generally correct, but there are certain defects in the jail that no jail-keeper can successfully cope with or remedy, and those defects are insufficient accommodations, defective sewerage, ventilation, and the combined influences of all sorts of fumes, odors, and gases, arising from the cooking of food for two or three hundred prisoners, without any air-shaft to carry these odors, gases, and fumes off." The charge continued that it is the province of the jury as citizens in the discharge of duty to make suggestions in regard to any defect that may be discerned. The attention of the jury was called to the fact that the criminal court building has no retiring rooms for ladies. There are fifty to one hundred ladies in attendance at every term of court, and yet there are no sitting rooms provided for them. Common decency, his honor thought, would dictate to the county commissioners that this should be remedied, but it is not.

NOTES AND NEWS.

FOOD ADULTERATIONS.

In a recent trial at Manchester, England, a milk-dealer confessed that he put a quart of water in each of his cans. One of the men engaged in the business of dilution, said to another employé: "The pump is the cow that gives the milk."

LIGHTING.

At the meeting of the North East Coast Marine Exhibition, in England. a burner designed by Sir James Douglass, was shown in action. The burners are for gas or oil. One of these burners gives, with 16-candle gas, a power of 1,500 candles, developing, it is claimed, 6 candles per cubic foot of gas. A double Argand Douglass gas burner, with a 21-inch parabolic reflector, gave a beam of 5,000 candles. For oil a double Argand Douglas gives a beam said to have an intensity of about 6,000 candles.

The Philadelphia Gas Trust Company has received an offer from Dr. W. R. de Kroft, in behalf of the Excelsior Gas Light Company, of New York, to put the Spring Garden Works into operation at the cost of his company, and furnish gas to the holder at 22 to 25 cents per 1,000 cubic feet.

The Brush Electric Light Company, of Philadelphia, has been lighting Chestnut street since December 5, 1881, without cost to the city. It is understood that if no provision to pay for the light is made, the lamps will be extinguished after December 5, 1882.

The Gas Company turned off the gas from all public buildings in New Orleans, and from the street lamps, recently. The city owes the Company $200,000 of old debt, and has not paid the monthly installments on a cash contract since July.

The new gas company in the Town of Lake, a suburb of Chicago, has laid nine miles of mains,and the work is progressing at the rate of nearly five hundred feet a day. The number of private consumers does not yet exceed one hundred.

MISCELLANEOUS.

Dayton, O., is a city of 40,000 inhabitants, but it has no sewers, the excreta being disposed of in vaults and cesspools. Of the 8,000 houses in the city, 5,000 of them are said to have water-closets discharging into covered vaults. Previous to 1879, old vaults were covered with earth and abandoned, so that the ground is pretty well filled up with them. Now the contents must be removed before a vault can be abandoned. The liquid waste of houses percolates through the soil and will in time contaminate the water-supply. The Board of Health has been urging the construction of a system of sewerage for fourteen years.

A man whom the Board of Health of New York were forcing to replace earthern pipe under the house by iron, and claimed that he had done so, put in a "dummy" house drain and fresh-air inlet, without any solder, and some of the pipes were not even run into each other. The whole thing was carefully covered up and the fresh air inlet run out to the proper place. None of the soil or waste-pipes were connected to this dummy. The inspector pulled the whole of the fresh-air inlet out with one hand.

Messrs. E. B. McCagg, Potter Palmer, Alexander McKay, Archbishop Feehan and others, prominent property-owners in Chicago, have asked the city to give the property along the Lake-shore drive and north of Division street a separate system of sewerage, the sewers to be discharged into the lake rather than into the State street main, and thus into the river. This plan will involve an increased expenditure of $15,000, and, besides, tend to contaminate the water-supply.

The Phœnix Electric company of Chicago has been organized with a capital stock of $250,000. Its incorporators are Charles G. Ayers, Charles H. Chamberlin, Robert H. Waugh, Joseph A. I. Craig, and James Ayers. It is reported that the company contemplates the erection of factories and the manufacture of electric machinery at an early day.

The Boston health authorities recently issued an order forbidding public funerals of victims of small-pox, typhus fever, scarlet fever, or diphtheria, a precautionary measure which most cities have in effect at all times. There is said to be no small-pox, however, in the city.

Malignant diphtheria has been prevailing at Frankford, an immediate suburb of Philadelphia. Five children of William Pray and two of Rev. W. Hamilton died within a few days. Sixteen scholars in the public school were sick with the disease at one time.

The Philadelphia Board of Health is preparing rules for the sanitary management of diphtheria, urging especially upon the community the danger of personal contact. The deaths thus far this year number 730, against 457 in 1881.

Three hundred and thirty of the eight hundred men composing the Berkshire regiment at Cairo, Egypt, are ill, owing to the bad sanitary condition of the barracks.

The epidemic of yellow fever at Pensacola, Florida, has been declared at an end. Absentees are advised not to return to their homes at present.

The Fullerton avenue conduit is completed to Ashland avenue, a distance of 1,700 feet from the North branch of the Chicago river.

During the year over thirty-five miles of streets in this city have been improved. The work for the season is now practically closed.

BUILDING INTELLIGENCE.

Marx Wineman is having an elegant residence built on Michigan boulevard near Twenty-sixth street, at a cost of $60.000. It is of Trenton brick and buff Bedford limestone. The front steps are in Concord granite, and the porch is supported on massive columns and pilasters of polished Quincy granite, with richly carved capitals. The approach and front fence are of Bedford stone in very massive design. There are also polished granite shafts incasing the dormer windows in the top story, and the roof is terminated in rich galvanized iron crestings. Terra-cotta panels are used with fine effect in the decoration of the ex-

terior walls. The interior is divided on excellent ideas of convenience and symmetry, and the rooms are spacious and elegantly finished in hard woods. The stair-cases are especially elaborate.

The North Chicago Malleable Iron-works, a new company composed of W. B. Ullman, late of the Chicago Drop Forge works, and W. L. Cosgrove, recently of the Northwestern Railway Company, will build on the corner of Diversey avenue and the Northwestern railway's right of way, a building 15x65 feet and another 75x65 feet, for the manufacture of malleable iron. The company has purchased one and one-half acres of ground for their purposes. The machinery will be new and the furnaces and annealing ovens will be of the latest patents. The buildings are connected, and the work will be in operation early next year.

An opera-house will be erected outside the business center of the city, at the corner of State and Twenty-second streets, after the plan of the Madison Square theatre, of New York. As the city is rapidly extending southward there seems to be no reason why this should not prove a success. In fact, the location is the center of a large population composed of the best people in the city. The projectors and incorporators are Harvey R. Newman, William Eddings, E. B. Jennings, W. H. Shirland and John Ling.

The Bullock Manufacturing Company is about to commence the erection of a number of buildings between Lake and Fulton streets, just west of the Columbus, Chicago and Indiana Central Railroad, at an ultimate expense of about $400,000. The first building will be a machine-shop, 120 x 175 feet in size, and three stories high. The firm will manufacture mining machinery and fast-running steam-engines.

The property on Madison street extending south along the east side of the river 105 feet, has been leased to J. H. Swart for fifty years. It is now occupied as a coal-yard by Robert Law. The lessee states that he will put up a building in the spring for mercantile purposes, which will cost $100,000. Improvements have been made in the immediate locality recently to the extent of $1,400,000.

D. Adler is about completing a $25.000 residence for J. A. Rothschild at No. 2633 Michigan boulevard. It is 36 x 75 feet in size. The basement is laid in Long Meadow brown stone, and the walls above of Bedford stone, brick and polished granite. The entrance will be ornamented by porches of original design.

C. P. Kimball is building a fine residence on Ontario street, near Cass, which will cost $40.000. It measures 46 x 65 feet. It is built of Philadelphia pressed brick and Columbia sand-stone, the porch being ornamented with polished granite columns. D. Adler is architect.

It is stated that work on the new Board of Trade building will be continued during the winter, it having reached a point beyond which it is dependent upon the weather. The erection of the new office building on the south will be commenced in the spring.

Cleveland & Gay have let the contracts for the construction of six two-story and basement stone dwellings with swell fronts, for Ira Brown. They are to be located on Jackson boulevard, just west of Lincoln street, and will cost $24.000.

Mr. Daniel A. Loring proposes to erect a fire-proof building on Pacific avenue, opposite the new Board of Trade building, extending through to Clark street, and to cost $150,000.

The residence of Hon. J. Russell Jones, at No. 2108 Michigan boulevard, has been reconstructed and prepared for the use of the electric light, at a cost of $18.000.

A residence on La Salle avenue opposite Lincoln Park, for Mr. William F. Roose, will be built of Rockford green stone, and will cost $10.000.

An elevator and malt-house will be built by George A. Weiss at the corner of Clybourn and Ashland avenues, to cost $100,000.

The Travelers Insurance company is building several flats on Ogden avenue.

HYDE PARK.

Among the number of private residences to be built, the plans are completed for a house of peculiar and striking design for Mr. D. C. Bradley, of the Calumet Iron & Steel Company, at Kenwood. Brick, terra-cotta, and Pennsylvania green serpentine stone, similar to that used in the elegant and beautiful church at Pullman, will be used in the construction of the first story, while the second story will be in brick and slate. The prevailing style is the new English renaissance, with a broad gable which covers nearly the entire façade. The entrance will be at one side of the front, and on the west side of the house there will be a porte-cochère opposite the door leading to the ante-room of the main entrance. The interior is as original and unique as the exterior, and will be finished in different woods. The cost of the house is to be about $20,000.

Improvements south of Fifty-first street have been very marked this year. Between Fifty-first street and Fifty-fifth street boulevard, fifty-eight fine houses have been erected this year. They are on Wabash avenue, State street, Dearborn street, and Butterfield street. Besides these, two school-houses costing $36,600 each have been built—one near Fifty-first street and the other on the corner of Prairie avenue and Fifty-second street. The Chicago and Rock Island and Michigan Southern Railroad companies have built a fine depot on the corner of Clark and Fifty-first streets, at which all trains stop.

The three-story dwelling at the corner of Lake avenue and Thirty-ninth street has been purchased by Hon. H. N. Hobart, and is being reconstructed, preparatory to its occupancy by the new owner.

A fine block of houses will be erected on Oakwood boulevard, west of Langley avenue, by Mr. Robert H. Cherry, in the neighborhood of Oakland.

An elegant new residence has been completed and is now occupied by Mr. W. C. Ott, at the corner of Fifty-second street and Jefferson avenue.

Mr. J. Hamilton Bell, of the firm of Bell, Conrad & Co., is building a $10,000 residence near the corner of Drexel boulevard and Fortieth street.

A commodious residence is being completed by Mr. J. M. Gilchrist, at the corner of Chestnut street and Washington avenue.

Mr. A. C. A. Posing is building a neat house, costing $7,000 on the north side of Fifty-third street, west of Jefferson avenue.

Several fine residences are in course of construction on Lake avenue one of which will cost $30,000.

BUILDING PERMITS.

The following is a list of all new buildings in Chicago for which permits have been granted during the past two weeks, giving location, size, cost, and name of owner:

Mohawk st. and Garfield ave., 3-story flats, 22x68, $7,000; C. Scheel.
150 and 152 LaSalle ave., 5-story flats, 94x52, $25,000; D. J. Goldberg.
3265 Rhodes ave., 2-story dwelling, 18x22, $2,500; John Ela.
150 Oak st, 3-story flats, 22x55, $4,000; F. Davidson.
253 W. 13th st, 1-story kitchen, 15x16, $200; John Crawshaw.
605 Indiana st., 2-story store and dwelling, 24x64, $4,500; B. A. Hill.
1238 W. Madison st., 2-story store and dwelling, 25x60, $5,000; William M. Miller.
241 Ashland ave., 3-story dwelling, 24x44, $15,000; Miss A. E. Sweet.
LeMoyne st., near Robey, 2-story flats, 44x50, $6,000; J. A. Jansen.
442 to 446 Hubbard st., 3 story flats, 75x40, $12,000; W. B. White.
Quincy st., near Jefferson, 3-story lounge factory, 32x?0, $8,000; F. Fischbeck.
Oakley st., near Taylor, 1-story cottage, 20x32, $1,200; John Edland.
885 N. Halsted st., 2-story store and dwelling, 22x70, $5,000; Mrs. O. M. Armis.
856 Ashland ave., 3-story dwelling, 21x58, $5,300; F. Vitlocil.
Adams st., west of Dearborn. 5-story office building, 25x100, $30,000; J. L. High.
137 W. Taylor st., 2-story dwelling. 21x53, $4,500: Patrick Cooney.
235 and 237 S. Sangamon st., 2 2-story dwellings, 42x50, $6,000; T. J. Leonard.
181 Rush st., 3-story dwelling, 21x48, $5,000; R. D. McFadden.
3019 State st., 3-story store and flats, 24x70, $8,500; Michael Crane.
407 W. Chicago ave., basement, 25x40, $400; C. Young.
Fullerton ave., near Elston road, 2-story cottage, 20x50, $2,500; Fred Kuehl.
204 Kossuth st., 1-story cottage, 20x40, $900; John Schwerkert.
Fleetwood st., near Elston, 3-story front addition to tannery, 32x34, $2,400; Paul Populorum.
14 Spruce st., 1-story cottage, 21x44, $800; S. Dykeman.
630 to 634 Jackson st., 3-story flats, 116x65, $30,000; Charles E. Hyde.
Fremont st., near Center, 2-story dwelling, 20x50, $2,000; Fred Burns.
111 and 113 Laughton st., 2 2-story dwellings, 44x48, $5,000; D. A. J. Jones.
290 Wright st., 2-story dwelling, 21x52, $3,300; F. Slatkey.
12 Seward st., 2-story dwelling, 21x48, $2,500; F. Kolar.
Elston ave., near Western ave., 2-story shed, 50x100, $1,500; Thomas Moulding.
22 and 24 Adams st., 3-story store and art gallery, 40x80, $55,000; W. C. Stevens.
1003 W. Monroe st, basement, 20x40, $1,000; George A. Webb.
42 Dean st., 2-story dwelling, 20x34, $1,700; F. Mack.
2733 Logan st., basement, 20x30, $300; C. Morris.
553 Huron st., 1-story cottage, 20x16, $400; N. Hoving.
Polk st., near DeKalb, 2-story barn, 24x24, $400; J. L. Campbell.
480 N. Franklin st., basement, 18x42, $300; A. J. Cooper.
296 Augusta st., 1-story cottage, 20x30, $1,000; M. Eich.
584 Huron st., 2-story store and dwelling, 22x55, $2,300; A. Shepploring.
438 Chicago ave, 3-story store and dwelling, $5,000; George Johnson.
Bissell st. and Garfield ave., 4 2-story dwellings, 72x39, $11,000; H. White.
174 N. Oakley st., 1-story front add., 20x7, $200; Mrs. E. Lane.
W. Division st., 1-story dwelling, 25x50, $1,500; S. Price.
49 Eldridge ct., 1-story office, 12x16, $50; Dr. Miller.
4 N. Wabansia ave., 1-story cottage, 20x30, $1,000; John Pottle.
N. Ashland ave., near Bloomingdale road, 2-story dwelling, 20x40, $1,500; L. Burkel
302 and 304 Honore st., 3-story training school, 44x92, $20,000; Ill. Training Schoo. for Nurses.
1180 and 1182 W. Jackson st., 2 2-story dwellings, 42x48, $5,000; John Coombe.
805 W. Madison st., 3-story store and flats, 30x65, $9,000; J. F. Tenney.
149 Samuel st., 1-story cottage, 20x30, $600; Joseph Palosky.
338 Center ave., 2-story flats, 22x50, $4 000; M. Schaners.

The Sanitary News.

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CONTENTS.

WORDS OF COMMENDATION 37
CURRENT TOPICS:
- The Sanitary Condition of Tailor-Shops 37
- How Smoke May be Utilized 37
- Ventilation of the Guildhall 38
- Lighting Railway Cars 38
- Condition of the Cook County Jail 38
- Sickness Among British Troops 39
- Koch's Theory of Consumption Doubted 39
- Health as Capital 39
- Gas and the Electric Light as Competitors 39

DISINFECTANTS 40
PRACTICAL HOUSE DRAINAGE 40
COMBUSTION AND SMOKE PREVENTION 41
THE NEW BOARD OF TRADE BUILDING 42
ILLUSTRATION 43
HOW ARE WE TO AVOID BEING POISONED WITH SEWER-GAS? 44
HOW TO DEAL WITH DIPHTHERIA 46
HEALTH IN MICHIGAN 46
A WARFARE THAT ENDS IN EXTERMINATION 46
ARTIFICIAL CHILD INCUBATION 47
COOK COUNTY VITAL STATISTICS 47
NOTES AND NEWS:
- Lighting 47
- Water Supply 47
- Food Adulterations 48
- Sewerage 48
- Miscellaneous 48

BUILDING INTELLIGENCE 48

IT is gratifying indeed that such kind words should be written of THE SANITARY NEWS as those of *The American Architect*, of Boston, in a recent issue. That paper stands at the head of those of its class in this country, hence its few words of commendation are better than a thousand from some other source. This is what *The American Architect* says: "It is a pleasure to encounter a new journal which is made up with an eye to appearances, and the tastes and predilections of its subscribers for good book-making,—for most publishers intend that their journals shall have more than an ephemeral being, and in their 'make-up' keep an eye on the appearance that the bound volume will have at the end of the year. Trade papers are rarely issued in such creditable form as this of THE SANITARY NEWS, which in every respect compares most favorably with the only competitor in its specialty that is now published in this country—leaving out of the question such monthly publications as interest themselves with matters of sanitation. There can not be, for the good of the public, too many journals of a high grade, making a specialty of matters of public health, and though, of course, a survival of the fittest is to be expected, we see every promise in the two numbers of this journal which have reached us that it will be found amongst those which have the best right to a long and useful career." The following, also, from Prof. A. B. Prescott, of the Department of Pharmacy, in the University of Michigan, whose high reputation as a chemist is as wide as the country itself, is in a personal letter: "I shall be glad to serve your journal in any way I can, because I am heartily in accord with sanitary efforts, and because your enterprise deserves success. I am glad to see such a well-chosen and well-digested presentation of sanitary intelligence here in the Northwest. The large amount of original and editorial matter is a sufficient proof of force in the undertaking and must be appreciated."

THE workmen in tailor-shops in Glasgow are about to ask the intervention of the authorities that the sanitary condition of the shops may be improved. There is no greater need for such intervention in Glasgow than in this city. The health authorities here have given some attention to the large establishments down town and means of ventilation have been provided and overcrowding restricted, if not wholly prevented. But there are thousands of women and girls packed into sweating-shops on streets off the main thoroughfares in the Scandinavian, Polish and Bohemian districts, which have never been interfered with. These shops consist mainly of old wooden buildings which have been abandoned as dwellings. There is no ventilation for them, and the drainage is in a terrible condition. The people employed in these places are engaged in making suits at starvation prices, and they are stitching their lives away by working in noisome pens from twelve to eighteen hours a day. There is another thing to be taken into consideration, and which suggests, if not demands, the daily supervision of the sanitary authorities. If small-pox finds its way into the families of any of these poor people, who cannot afford to lose their time, they continue their work, and thus the germs of the disease are conveyed to and ultimately carried through the new-made clothing to those who purchase it. It is undoubtedly true that this accounts for the occasional inexplicable outbreaks of small-pox. It is said that nine-tenths of the clothing sold in this city is made in these sweating-shops, many of which are in the basement of the poorest tenement houses.

SMOKE belching from the chimneys of manufactories, from locomotives, tug-boats and miscellaneous smoke-stacks is a nuisance not only by reason of the discomfort attending its presence, but on sanitary grounds. It is on this account that the views of a practical engineer are given a place in the columns of this number of THE SANITARY NEWS. It is a difficult question to settle, how to prevent smoke and at the same time get all the heat out of fuel quickly and economically. That this can be done seems true; all that is needed is the application of a little intelligent thinking on the subject. It is actually a loss of money to create smoke and then waste it. If it must be generated, let it be utilized. A company at Elk Rapids, Michigan, is

doing this. The smoke is condensed in stills charged with lime and surrounded by cold water. The result of the condensation is acetate of lime, alcohol, tar, and gas, the last being consumed under the boilers. A thousand cords of wood are converted into charcoal daily, yielding 2,800,000 cubic feet of smoke, from which are obtained 12,000 pounds of acetate of lime, 200 gallons of alcohol, and 25 pounds of tar. The alcohol has been contracted for five years to a firm at 80 cents a gallon. But smoke contains not only the valuable unburnt and usually wasted carbon, carbonic acid and oxide, and sulphurous acid, but also the fumes of hydrochloric acid, lead, copper, arsenic, and other unwholesome vapors. "An atmosphere charged with these malodorous and mephitic additions," says Dr. Dennis Embleton, of London, "cannot be supposed to be particularly salubrious. It certainly does not possess antiseptic qualities sufficient to ward off infectious or zymotic diseases; if it did, it might be endured with some degree of patience and resignation; but as it is, it is a great evil, and demands abatement. It blackens our streets and buildings, our faces, hands and clothes, our books and silver plate; it penetrates our air passages and lung cells, giving rise to feelings of choking and sooty expectoration; it induces general depression and constipation; it injures and destroys our trees and damages our crops. There would be an immense benefit to both town and country if the smoke could by any means be reduced to the smallest amount compatible with the carrying on of profitable business."

THE council chamber at the Guildhall, London, was formerly as poorly ventilated as public halls in this country. A new system has been in operation since January last, and now, after repeated official tests it is pronounced successful. It is described as follows: Nine self-acting air-pump ventilators are fixed on the top of iron shafts, standing at various heights above the roof, to clear them of obstruction. Four of these shafts, two at each end of the chamber, are each 13 inches in diameter, branching off a little above the ceiling into two 10-inch pipes, communicating with openings in the ceiling 2 feet in diameter, concealed by means of ornamental center flowers, or ceiling plates. On the top of each shaft is fixed a 2-foot air-pump ventilator. At the east end of the chamber a shaft 18 inches in diameter is carried through the roof, having a 30-inch ventilator on its top. This shaft expands at the bottom to 2½ x 2¼ feet, covering an opening of the same dimensions in the ceiling. At the west end, a shaft 30½ x 20½ inches is brought into requisition, and is carried up a considerable height to the top of an adjoining building, surmounted with a 3-foot ventilator. A shaft 16 inches in diameter, that is connected with the large "sunlight" gas-burner in the lantern over the central dome in the chamber, is also run into this shaft, the ventilation of the body of the room being partially effected by this means. On the top of the outer casing of the lantern three 13-inch shafts are fixed at equi-distant spaces, and covered with 20-inch ventilators, the shaft communicating with openings in the interior of the lantern by means of expanded iron hoppers, and these complete the arrangements for the extraction of the vitiated air from the chamber. A portion of these shafts formed part of the old system of ventilation, and were surmounted with revolving cowls. For the supply of fresh air to the chamber there are, on the south side of the chamber, four vertical air-tubes, or brackets, which are fixed against the walls. Two of these are 2 x 3 feet by 2½ inches, and the other two, which are placed a little higher up the wall, are 18 x 4 inches by 2 feet. The tubes communicate directly with the outer atmosphere by holes cut through the walls and are covered with cast-iron gratings. The air-inlets are fitted with heaters, for the purpose of warming the incoming air to any temperature required as it enters the building. The north wall is similarly treated, with the addition of an extra tube at the end by the Lord Mayor's seat. At the public end of the chamber three more inlet tubes are fixed, similarly fitted with the air-warmers, while others, amounting in the aggregate to sixteen, are fixed in other positions, completing the arrangements for the fresh air supply. An abundant quantity of air is admitted, and it is said that the air can be warmed in cold weather to a temperature from 60 degrees to 120 degrees, thus entirely preventing cold draughts. The average quantity of vitiated air withdrawn amounts to 500,000 cubic feet per hour.

A TEST has been made at Cincinnati of a new means for lighting railway cars by compressed oil gas. The gas is stored in tanks beneath the floor of the car, and a supply for twenty-six hours is carried. The coach in which the experiment was made was fitted with five lamps, aggregating thirteen burners, consuming about eleven and a half cubic feet of gas per hour. The light produced is said to have been so brilliant that the finest print could be read in any seat. It is claimed that the gas is as economical as oil and much safer, as in case of accident the gas would go out at once. The manufacture of the gas would first require an outlay, however, of from $10,000 to $20,000 for the "plant."

THE COOK COUNTY jail, the condition of which has been already adverted to in these columns, is a monument to the stupidity of its builders, so far as its unsanitary features are concerned. Through the stimulus of an investigation and report by the grand jury the county commissioners have finally directed an architect to devise means to remedy the defects. It is hard to credit even the facts brought to light by the investigations of the health officers, and which were submitted to the grand jury. The building was hastily erected after the fire, and, of course, that which was hidden from sight received least attention. The rooms, corridors and all apartments are warmed by heated air brought up through brick flues from the basement. The air is heated in its upward course by steam-coils which are placed in the flues. The air is introduced into each flue by an opening twenty inches square, and from eight to ten inches above the ground in the sub-basement. Within the walls inclosing this sub-basement are all the cesspools which, with two exceptions, contain the excrement and other waste from all the prison cells. One of these was found within three feet of the opening of one of the hot-air flues. The earth of the basement was found to have been largely polluted by vermin, which had burrowed in the earth in great numbers. The sewers are ventilated directly into many of the cells through untrapped and defective

soil and waste-pipes. Not a single soil or waste-pipe is extended to the roof; none of the traps are specially ventilated, and many of the traps siphon whenever the pipes are used. The direct effect of the breathing of the polluted and poisonous air of the entire building is seen in the ill-health of the occupants. Prisoners who have been confined there for any length of time are debilitated; judge and jury are actually prostrated, and it is no uncommon thing for witnesses, who have been on the stand in the court-rooms for some time, to faint. It is ascribed to the terrible ordeal of a prolonged examination on a question in which life is at stake, as in the case of the Sturla woman, a few days ago, and not at all to the atmospheric poison which they have been taking into their lungs at every breath.

THERE has been recently sickness among the British troops at Cairo, numbering some twelve thousand men, which caused considerable alarm. Notwithstanding the month of November is one of the healthiest of the year in Egypt, the men suffered greatly from enteric fever, dysentery, diarrhœa and ophthalmia. The men were not acclimated, and on their march to Cairo they were compelled to drink bad water, the condition of which was undoubtedly due to the filthy condition of the barracks when the city was first occupied. In spite of the salutary effects of the voyage home, there is said to be considerable sickness among the troops who have returned to England. The barracks both at Alexandria and Cairo are undergoing a thorough painting and cleansing, and the sanitary arrangements improved as much as possible. The dry-earth system, as practiced in India, has been adoped. The diet of the men has received attention, and orders have been given to supplement it with as much vegetable food as the local markets will afford. All the interior economy of the force is to be based on Indian, rather than the European, system. At Alexandria the principal hospital is a building consisting of four large sheds facing the sea, which will hold three hundred beds, and it is contemplated to supplement it by the equipment of a hulk hospital, capable of holding two hundred patients. Invalid soldiers will be given trips up the Nile, in steamers engaged for the purpose, to the First Cataract. Some will be sent for days out to sea, while others will be removed for change to the hospitals at Malta.

IT is reported that Dr. H. D. Schmidt, president of the Pathological society of New Orleans, is prepared to disprove the theory of Professor Koch, of Berlin, who recently claimed to have found that the cause of consumption was a small parasite to which he gave the name of bacillus tuberculosis. He claims to have spent years in the investigation of the subject, and when the Berlin theory was propounded he sent to Germany for mounted specimens of the bacilli for examination with his microscope. It is reported that he finds them to be identical with fatty crystals of a peculiar form, taken from the lungs of persons who had died of consumption. His assumption that the latter are not genuine bacilli is based upon the results of a test in which he subjected them to the action of hot ether; under this action they disappeared, apparently dissolved. He claims that if they had been genuine bacilli they would have remained intact. Granting that the alleged bacilli discovered by Professor Koch were genuine, the theory that they are the cause of consumption is still a theory only. Though they may thrive in a diseased lung, it is no proof that they can have any effect upon healthy tissue; in other words, they may be the result and not the cause of tuberculosis.

INCENTIVE and example in sanitary matters are both furnished by our elder brothers across the ocean. People here may think that time is wasted in doing, or thinking about, anything which does not give an immediate return in dollars or in cents. But health is capital, as Lord Roseberry, who presided at the first of the third series of lectures under the auspices of the Edinburgh Health Society, pointed out. A man might not have a shirt to his back, but if he had health he had capital to that extent. But this capital was often put out at an insufficient interest. Lord Roseberry advocated the distributing of leaflets, or tracts, bearing upon health. There were religious tracts and political tracts and, for the same reason, there might be health tracts. He thought that the pulpit might do very much in the dissemination of sanitary knowledge.

PROF. SIEMENS believes that the introduction of the electric light will go hand in hand with an increase in the consumption of gas, and that the consequent competition can not fail to improve the quality and cheapen the supply of both, greatly to the advantage of the public. As the light of luxury, electricity must win, but gas will at the same time find an increasing application for the more humble purposes of diffusing light. He believes that by the improved arrangement of the burners nearly double the amount of luminosity might be had, while at the same time the character of the light itself would be improved. Further, he believes that it would be advantageous that two qualities of gas should be supplied, one for heating and one for lighting. Such a general supply of heating separately from illuminating gas, by collecting the two gases into separate holders during the process of distillation, would have the beneficial effects of giving to lighting gas a higher illuminating power; of relieving our towns of their most objectionable traffic, that in coal and ashes; of effecting the perfect cure of that bugbear of our winter existence—the smoke nuisance; of largely increasing the production of those valuable by-products, tar and ammonia, the annual value of which, in England, already exceeds by nearly £3,000,000 that of the coal consumed in the gas-works.

THERE is said to be great prevalence of contagious diseases in St. Louis at present and the Board of Health have ordered that the bodies of persons who have died of scarlet fever, small-pox, or diphtheria shall not be allowed to be shipped or taken to other points, and the public is advised to effect a speedy and quiet burial of persons so deceased. They have also approved a circular addressed to the people of St. Louis concerning scarlet fever and diphtheria. It advises hasty burials, requests a cessation of visits to houses where the sickness is prevalent, and discountenances the attendance of friends at funerals; calls for disinfection and fumigation of premises; calls the attention of physicians to the laws concerning contagious diseases, as also that of the public to the ordinances governing the parents of children who are sick with a contagious disease going to school, and requests undertakers to disinfect conveyances in which the remains of children who died of either scarlet fever or diphtheria have reposed.

DISINFECTANTS.

In popular estimation and use the chloride of lime holds the first place as a disinfecting agent, while in fact it is probably one of the most inefficient and useless. Chlorine gas is a powerful germ-destroyer, but it requires some care in generating it, and it is extremely irritating to the lungs even in small quantities. Of course, to be properly used the rooms must be vacated. All clothing, bedding, etc., to be treated should be suspended on lines stretched across the rooms. Cracks, and door and window crevices should be covered by strips of paper pasted over them. Procure a sound earthen pot of four gallons capacity and throw into it equal parts by weight of black oxide of manganese and common salt; then pour upon the mixture one and one-half parts by weight of sulphuric acid. For every one hundred cubic feet of space to be fumigated use one pound each of manganese and salt, and one and a half pounds of commercial sulphuric acid. The pot is large enough to allow for frothing. Vacate the room at once. The material required is cheap and can be procured at any drug store and any intelligent person can safely conduct the operation. After eight hours the room may be opened and aired. Thus used, chlorine is a reliable disinfectant. The chloride of lime is made by saturating slacked lime (carbonate of lime) with chlorine gas. It is a very variable compound and at best contains only about thirty per cent. of chlorine; as found in the shops it is much weaker and practically worthless. It is often used in attempting to disinfect street gutters, sewers, privy vaults, etc., and is scattered about rooms and water-closets, supposed to be infected, but since it parts with chlorine so slowly its use in this manner is futile and deceptive; simply an odor of chlorine is diffused about, but no true disinfection is accomplished.

Sulphurous acid gas is one of the oldest disinfectants known and still holds a place in the foremost rank of substances so used. This gas is easily generated when wanted by burning brimstone or sulphur. The same preparation of room and clothing should be made as for use of chlorine. For every one hundred cubic feet of space two ounces of crushed roll brimstone should be used. Take a wide-mouthed iron pot, one-third full of ashes, made compact by pressure, and place upon this bed a fire-shovel full of good wood coals brightly burning. Throw on the brimstone and leave the room, which should not be opened for eight hours.

Among the metalic salts, sulphate of iron—popularly copperas, or green vitriol—is a cheap and efficient disinfectant. It is also a deodorizer, for it destroys the offensive gases of decomposition.

A solution, always ready for use, may be prepared as follows: Place a sound barrel on any convenient stool, or bench, in an out-house, or cellar; insert a wooden spigot four inches from the bottom end, and fill with water. Suspend in the water sixty pounds of sulphate of iron in a coarse sack and in two days we have a barrel of admirable disinfecting material, which should not cost more than $3, and which may be freely thrown into privy-vaults, or cess-pools, and on all discharges supposed to contain disease germs. It should not be used on fabrics, which would be injured by discoloring.

The sulphate of zinc—known as white vitriol—is an excellent and powerful disinfectant. Being colorless it can be used in disinfecting bed linen and clothing, which the iron salts would discolor. It may be prepared by putting eight ounces of the salt into a gallon of water, and this solution may be used in all vessels in which infectious discharges are received. All soiled clothing, towels, bed-linen, etc., should be put into this solution, made boiling hot.

Charcoal and dry earth are good deodorizers, but are not disinfectants. Caustic lime (before it is slacked) broken into small lumps and scattered over out-places charged with decomposing organic material, absorbs the moisture and perhaps breaks up disease germs by its caustic action; so it may be said to be a disinfectant, but it does not remove odors. Air-slacked lime has no value as a disinfectant or deodorizer.

The coal-tars and their products have been used largely as disinfectants; carbolic acid, particularly, when first introduced, was highly thought of as a volatile disinfectant and deodorizer. It is now believed that this vapor "may arrest putrefactive changes—as an antiseptic—but that its influence ceases as soon as it is removed," in other words, that it does not induce a permanent change in the putrefiable material, but suspends the action of the process of putrefaction so long as it is present. This conclusion seems established by the experiments of Dr. John Dougall, of Edinburg. When this agent is used in solutions of from ten to thirty per cent. of strength, it is still regarded as a disinfectant. The coal-tars are practically worthless as disinfectants, and so of the carbolic acid powders found in the market, and advertized as disinfectants, made up of some absorbant material, as saw-dust, clay, etc. Burnt coffee, sugar, and vinegar may be called deodorizers since they substitute one smell for another, but they have no disinfecting properties.

PRACTICAL HOUSE DRAINAGE.

BY J. J. WADE.

The first point to be considered relates to the sewer, or drain-pipe, which is laid under the house and has almost invariably been an earthen pipe. This has led directly to nearly all the troubles of defective sewerage, as the workmen who lay these pipes are usually inexperienced and careless and do not cement the joints properly. In a great many instances, the pipes are laid to such a depth beneath the surface that whenever they have been disturbed in the least the joints have cracked and sewage, leaking through these cracks, has impregnated the earth to such an extent as to make the earth in the cellar the medium of conveying gases through the building. To avoid this danger a cast-iron pipe dipped in asphalt or tar, the joints calked properly with lead, should be used instead, giving no possible chance for any of the defects so prevalent in the earthen pipe. This iron drain-pipe must be laid at a proper gradient, connecting with the main sewer in the street. An iron, running, ventilating, non-siphon trap should be placed in the pipe at the area or curb wall with a man-hole built around it, and a 4-inch ventilating pipe carried up to the surface. Where the main drain is carried along in the cellar

it should be laid in a masonry arch; with small man-holes, in case of the stoppage of the pipe, it can be cleaned conveniently. The masonry arch should not be laid tightly around the pipe to interfere with the flow of any leakage that might possibly occur, and which would collect in man-holes and be easily detected there. The ventilation of this sewerage system requires that all pipes be carried through the roof, and through chimneys where practicable, in the following manner: An air-pipe should be conducted from the house-drain at a point outside the building up to and four feet above the roof. If the building is new it should be built in the wall, of the same material as drain pipes. A similar pipe should be run up a hot-air flue, the outside pipe to be used to supply pure air to the pipe carried up the hot-air flue, thus creating a constant circulation of air in the house-drain.

When water-closets, bath-tubs, wash-stands, etc., are placed in a building, an iron pipe, similar to the one mentioned, should be lead-calked into the drain pipe in the cellar with a hand-hole placed near the elbow or fitting where they connect. This pipe should be carried up through the roof. Every fixture in the building should be trapped, and a ventilating pipe carried from the top of each trap, and as near the water line of the trap as possible, up independently through the roof. Where basin waste-pipes are trapped the overflow from them should be connected into the water-holder of the trap and the trap placed as near the basin as possible; this applies to every fixture in the building.

Lead-lining should be placed beneath water-closets, bath-tubs, and wash-stands, so that when a leak or overflow takes place the parlor ceiling and surrounding wood-work will be protected from soil and urinal matter. A waste-pipe from the lead-lining should be carried down to a point in the cellar, not to be connected with any sewer, as its services are only required in case of breakage, and this only for the short time required to repair the break. In a majority of cases, the safing in buildings is placed on the floor immediately underneath the fixture, serving only as a preventive against an overflow, but if pipes under the floor should break, it is of no service, and the very purpose for which it is intended is frustrated. The correct way to do this work is to counter-sink the joists and lay false floors in the parts counter-sunk, thus making it sink fashion, with an incline to the waste-pipes. All the traps, supply and waste-pipes should be run along the top of this lead safing, thus protecting surrounding wood-work and the ceiling underneath, leaving the pipes exposed. In case of leakage they can then be got at without the trouble of tearing up the floors. No floors should be laid over safing, and a bathing-tub, when used, should be placed on iron strips, on a level with the floor, leaving a space of two inches underneath. This space answers two purposes, that of detecting a leak in the tub, and acting as an air-chamber, thus giving foul matter and gases no opportunity to collect. The water-closet should be set in a similar manner, a board being placed across the safing only wide enough to admit of the fastening of the flange of the closet to it to secure the latter. The seat and riser of the water-closet should be hung door fashion, with a threshold under the riser, so that the door shall find no obstructing carpet when opened for the purpose of clearing the space under the closet. A pipe of galvanized iron or tin should be carried up through the roof from the enclosed space under these fixtures, for the purpose of carrying off all impure air which might collect. Where supply, waste or other pipes run vertically, they should be placed inside a box built in a partition, and in the front part of the box a door should be hung so that the pipe can be got at without difficulty. When the pipes run under floors, a similar box should be made, lined with lead, with an incline toward the waste-pipe, which should run down to the cellar. The pipes should be laid in this box, which should have a cover hinged or screwed to the floor. Brass hand-holes should be placed in iron pipes and bends, or T's, so that in case of stoppage they could be cleaned without breaking the pipes.

The system of ventilation I have here given, I have found to be the best, in a sanitary point of view, to be used in a building to be occupied as a habitation, by reason of its simplicity. The only objection I have had to combat has been that there are no complications to lead one into a maze of uncertainty, into which high scientific authority is so prone to lead the general public. The public wish practical results. I have found in my many years' experience — and the results of the system I have here outlined, use and advocate, justify me in the statement — that it is as near perfect as the science of ventilation, as developed to-day, can make it.

COMBUSTION AND SMOKE PREVENTION.

BY A PRACTICAL ENGINEER.

The combustion of soft or bituminous coal will be here chiefly considered. It is well known that coal consists chiefly of carbon, combined with oxygen and hydrogen. It is also equally well known that diamonds are composed of carbon uncombined with any other substances and crystallized, and that carbon is a bad conductor of heat. Carbonic acid is found in small quantities, free in the atmosphere, and is not only incombustible, but is a non-supporter of combustion and is one of the products of combustion. In practice it should be eliminated from the combustion chamber at the earliest practicable moment after it is produced. How to do this will be considered further on. Caloric, or heat, is merely a form of motion. It is produced by either chemical action or mechanical force. Combustion is the chemical combination of the constituents of the burning body with oxygen. Thus the oxygen of the air passes into a state of chemical union with the carbon and hydrogen of the coal, forming the motion that is called heat. Oxygen has as much to do with the process of giving heat as the more solid and costly material, and yet coal is called the burning body and the oxygen the supporter of combustion. Experiments show that the amount of heat obtained is proportional to the quantity of oxygen required to produce the decomposition of the combustible solid. The chemical affinities of oxygen for all elementary substances is so great and powerful, as to combine strongly with non-combustibles—in such proportions as to render them innoxious. It forms about one-fifth in bulk and a little more than one-fifth in weight of the atmosphere, the remaining portion being chiefly nitrogen.

Having thus far stated facts, deduced by scientists after years of careful and laborious experiment, let us consider the means necessary to make combustion complete and economical. There must first be room in the furnace for the gases evolved by the application of heat, which greatly increases the rapidity of the combination of oxygen with the gases of the coal. Generally, owners of boilers anxious to get their boilers as hot as possible, overlook this essential condition, and the result is that the carbonic acid combines with the free carbon in the furnace before the admitted oxygen has been able to combine with both, rendering the one innoxious and making combustion complete. The result is that the heavy masses of black carbon borne upon and combined with the carbonic acid is drawn by the draft in the chimney past the bridge-wall, through the flues of the boiler, and thence out into the atmosphere, through the chimney, only to descend and blacken everything it touches. Were the furnaces properly built—smaller at the fire surface and gradually widening at the sides—and the boilers raised to a proper height and sufficient air admitted to the furnace, none of these disagreeable effects would be seen. The oxygen would mingle freely with the gases from the coal, and absorb the carbonic acids and the combustion would be complete. Nothing would emanate from the furnace to soil the flues, the chimney would be clean throughout its extent and no smoke would appear. But, says the objector, so much cold air as would be necessary to accomplish this would do more harm by requiring more fuel to give necessary heat than would be saved by complete combustion. It is not necessary to use cold air. You should, by all means, heat your air before passing it into the furnace. This is easily done by having the furnace walls built hollow. Then introduce air into the hollow space near the rear of the boiler and conduct it along next to the inside heated walls of the furnace, and by the time it has reached the front its temperature will be nearly as high as that of the furnace itself.

Then siphon the heated air into the furnace by a system of small steam jets placed in proper line along the front of the boiler with such direction as to act nearly in line with the draft and sufficiently elevated to pass over the top of the coal, but not enough to shoot over the top of the bridge-wall, and you will find that instead of needing more coal you are actually using less coal than with present arrangements, making no smoke and getting more steam.

Another plan may be tried, and it is believed with success, to prevent the smoke nuisance, but without economy or perfection of combustion. The process has no patent upon it and may be cheaply applied by any one desiring to do so. Pass a half-inch iron pipe into the smoke-stack about half way from the base to the top. Inside the chimney place a suitable number of common garden sprinklers to fill the chimney with a light spray. Attach the other end of the pipe to the water-supply pipe and let the water force its way through the pipe and sprinklers into the chimney. This will, inexpensively, drown the smoke particles, and as the water has a large power of absorption for the carbonic acid, will prevent the emission of that noxious gas into the outer air. Only a small quantity of vaporized water will be seen at the top of the chimney.

THE NEW BOARD OF TRADE BUILDING.

The new Chicago Board of Trade building, an illustration of which is given on the opposite page, will be the largest and finest structure in the city. Work on it was begun in August last, and owing to the mild weather has continued almost uninterruptedly up to the present time. The foundations are all laid and the walls of a portion of the first story completed. The building, including the office portion in the rear, will have a front on Jackson street of 173 feet, and 225 feet each on Sherman and Pacific avenues. The portion devoted to the Board of Trade proper will be 173 x 140 feet. The extreme height of the tower will be 300 feet, and the building itself, nine stories high. The material used will be Fox Island granite, and the cost of this portion of the structure will not fall short of $1,500,000. The style of architecture is modern gothic. The outside walls will be surrounded with large, full columns placed between the windows, and they will largely support the upper stories. The most important of these will be made of wrought-iron of 3-inch metal. They will be made in sections and bolted together. They will measure 80 feet in length by 42 inches in thickness, and will be the largest iron columns ever made in this country. They will rest on finished bases of marble. The shafts of the columns above the base will be of Scogliold fire-proofing, with a rich cornice, arches, brackets, etc., above them. As to the interior finish and decorations, everything will be artistic and appropriate. The ceiling will be in broad panels, with an arched skylight in the center, filled with ornamental stained glass. This skylight will measure 70 x 85 feet, and will have another above it in the roof of the same size. All the floor and roof construction will be of iron, thoroughly fire-proof. No wood will be used in the building except in the floor-surfaces, window-work and doors. The windows will be made of plate glass, some of them no less than 47 feet high; the one in the center tower will be 57 feet high. The main, or Jackson street, front is divided into seven parts. There are two pavilions, one on each corner; then two receding bays; the center portion of the elevation, on either side of the grand tower, and finally the grand tower itself. This tower will be 32 feet wide on the street. For 225 feet it will be built of stone and brick, and the upper 75 feet of iron. At a height of 220 feet will be placed a clock with four dials, and 10 feet above this will be an observation balcony, from which a view of any part of the city, and most of the suburbs, can be obtained. On either side of the main entrances will be square, polished columns of red granite. The main columns in front will be 20 feet high and 5 feet in diameter, surmounted with carved capitals, brackets, etc. They will support a balcony. For the foundations there were first laid 3-inch oak planks, firmly bedded in cement. Above these were oak timbers, 12 x 12 inches in size, placed from 12 to 18 inches apart, the intervening spaces being filled with concrete. To these were spiked another layer of oak planks, again covered with cement to the depth of two feet. Then came the stone, the first layer of which consisted of blocks three feet in thickness. This constitutes the foundation, a solid mass of material seven feet thick, as heavy as the superstructure to be placed upon it.

BOARD OF TRADE

The heating, ventilation and drainage of the building, of most importance in this connection, have not yet been fully decided upon. The sub-basement will be used exclusively for the apparatus for heating, ventilation and drainage. Flues of different sizes, made of sewer-pipe, are being built in the walls, to be used for ventilation. The heating will be by direct and indirect radiation from steam pipes, and the hot air will probably be admitted through registers in the floor, driven in by large fans. The foul air will be taken out both at the floor and at the ceiling, and conducted under the floors to a main ventilating shaft, within which will be built the main steam and smoke stack, the whole standing 185 feet high. The top of the ventilating shaft will be supplied with valves, which can be closed, if necessary, when the natural suction is insufficient, and a fan just under the roof be brought into action to draw the foul air off with sufficient velocity to change the air in the main hall every fifteen minutes. The principal foul-air ducts will branch out from the grain-pits in the center of the hall and be so arranged that the exact length and capacity of all will be the same.

The floor of the main hall is eighteen feet above the sidewalk. Above this floor will be two stories for office purposes, and the call board room will be located in one of them. The office building in the rear will be nine or ten stories high and will cost another $1,000,000. The architect of the entire structure is W. W. Boyington.

HOW ARE WE TO AVOID BEING POISONED WITH SEWER-GAS?*

BY V. C. VAUGHAN, M.D., PH. D.

It is a fact, which no one will now dispute, that many contagious diseases, some of them most deadly, as diphtheria, scarlet fever, malignant erysipelas, etc., are caused by the admission of certain germs into the body, where they rapidly multiply, and too often, at the expense of the life of their host. Every honest physician will tell you that medical science has, as yet, discovered no infallible cure for these diseases. If you are stricken with typhoid fever, the most skillful physician has no means of eradicating that disease. By the selection of suitable food and by the appointment of proper hygienic surroundings he may preserve your strength until the disease has spent itself (for by their growth and multiplication these germs produce substances which are poisonous to themselves), and in this way the physician may save your life. By the administration of certain remedies, the physician may even abate the fury of the fever, but this is all that he can do. Therefore, the only sure protection against these diseases is to prevent the admission of their germs into our bodies. This duty belongs to the sanitarian more truly than to the physician. Let us study briefly the conditions under which these germs develop and the means of destroying them or preventing their gaining access to our bodies. For the development of these germs, three things are necessary—warmth, moisture and nitrogenous matter. You can easily see that these conditions are often present in every sewer, in every cesspool, and, indeed, in every receptacle of filth. A single germ of typhoid fever, or diphtheria, under these conditions, will grow and multiply into millions of its kind. Suppose that the germs from scarlet fever or diphtheria are thrown into a water closet and thus gain access to a sewer. Here they grow rapidly. A current of air may bear an innumerable host of them along and up into the houses even in the most distant parts of the city, or in the village, or at the farm-house, they are directly returned from the cesspool or privy vaults. Remember that a city residence is not necessary in order to be poisoned with the germs, which are commonly denominated sewer-gas. The servant girl pours the slops into a cesspool and they pass on through a few feet of soil into the well from which they are returned to the house and used for drink.

How are we to destroy these germs or prevent their entrance into our houses? The means relied on for these purposes are two—ventilation and traps. The sewers are ventilated with the hope that the germs will escape into the air, be diffused and destroyed by the action of the oxygen. Ventilation of sewers is an absolute necessity and my complaint on this score is that it has been done both improperly and imperfectly. Ventilation of sewers by street-gratings is unwise. The pedestrian is liable to meet with gusts of air from these gratings, bringing myriads of germs into his lungs. Besides, these gratings are often situated near open windows or doors, and in this way the air of living or sleeping apartments may be contaminated. It requires no great knowledge of physics to understand that certain conditions may exist, which will interfere with the rapid diffusion of gases. Even in rooms of ordinary size there are often zones of air different in temperature and composition, and fresh air introduced at a given level may remain there for some time.

For these reasons I wish to enter a protest against the common method of ventilating sewers by street-gratings. All such openings should be tightly closed. How, then, should we ventilate sewers? I answer, by means of pipes which extend above the roofs of the houses. These ventilating-pipes should be of different heights, otherwise the current will sometimes be downward, but the shortest should be taller than the surrounding houses. In many instances, notably in large manufacturing houses, these ventilating-pipes may be run up inside the chimneys. The pipe should not terminate in the chimney. This is a common practice, but it is an objectionable one, because in the best constructed chimney there will at times be a downward draught. Let the iron ventilating-pipe run up inside the chimney and extend several feet above the summit of the chimney. With very little extra expense, gas jets may be kept burning in some of the ventilating-pipes and thus the destruction of the germs of sewer-gas may be insured. In the town of Slough, England, ventilating-pipes from the sewers pass up through the lamp-posts. This plan has been found to be a great improvement upon the street-grating system. Every cesspool should have a ventilating-pipe extending above the roof of the house. To sum up on the subject of ventilating sewers we may say: (1) Street-gratings should be condemned. (2) Ventilation should be secured by pipes which should either extend above the roofs of the houses or should carry jets of burning gas. (3) Ventilating-pipes should not open into chimneys. (4) The cesspool at the village, or

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farm-house, should be ventilated by a pipe extending above the roof.

The second method in use to prevent the entrance of sewer-gas into houses is by the employment of traps. By some a trap is considered a sure protection against the admission of sewer-gas. By others traps are considered useless, or worse than useless, because they give a false promise of protection. Just now this matter is being discussed with considerable spirit. Dr. F. H. Hamilton (*Popular Science Monthly*) takes a decided stand against the use of traps. He holds that sewer-gas may pass through the best traps even while they are sealed. Dr. J. G. Richardson (*Medical News*) has found a vegetable mold adhering to the inside of the waste-pipe and extending throughout the sealed trap. The editor of *The* (London) *Lancet* urges the abolition of traps and the use of disconnecting chambers. Then all of us know that many conditions — some of which exist in most instances of plumbing — may be present and cause the siphonage of traps. These are some of the most important objections to the trust ordinarily put in traps.

At this place it may be well to state that although a great number of traps, some of them very complicated, have been invented, none of them possess any material advantage over the ordinary S trap, and some of them, notably the bell trap, is objectionable on account of the amount of filth which it will accumulate, converting itself into a small cesspool. There are certain conditions under which a Bowers', Cudell's, or some other patent trap, may be more suitable than the S trap, but these are exceptions. Let us formulate these objections against the trap. They are as follows: (1) Sewer-gas may pass through sealed traps. (2) Vegetable mold may extend along the waste-pipe through this sealed trap and thus reach the house side. (3) Traps are liable to be siphoned either completely or sufficiently to break the seal.

The first of these objections is the one especially urged by Dr. Hamilton. It is argued by some that the occasional passage of small amounts of sewer-gas into a house cannot be productive of much, or any, harm. These persons say that sewer-gas in itself is not capable of producing any specific disease and that such diseases are caused only by specific poisons. This is true. Sewer-gas in itself cannot produce scarlet fever, diphtheria, or typhoid fever. Sewer-gas may produce a malarial fever and by its debilitating influence may render the body more susceptible to, and less able to resist, diseases coming from other sources. While this is all true, it must be acknowledged that sewer-gas is at all times liable to be contaminated with special poisons and if the gas can ever pass through sealed traps it may convey the special poisons with it. Even if sewer-gas in itself were perfectly harmless — which, as we have seen, is far from true — every time that we are exposed to it we run the risk of being poisoned with the particulate germs of disease; and diphtheria, scarlet fever, etc., are too deadly in their effects, especially among children, for us to run any risks. Where the life of one's children is concerned it is no time for him to reckon on the chances of escape and say that we are comparatively secure. He wants complete security. The question then becomes this: "Does sewer-gas ever escape into houses through water-sealed traps?" The answer is, it may and it does. Then what are some of the conditions under which this escape takes place, and can they be remedied? Houses are now built so tightly and the entrance of air through doors and windows so well prevented that during the winter months there is often considerable difference in pressure between the air outside and that within the house; also, a difference in pressure between the air in the drain on the inside of the trap and that on the outside. This, together with the force often exerted by currents in the sewers, is sufficient to cause the gas to bubble up through the water of the trap without destroying the seal. This danger would in most instances remain undiscovered. The trap would be found all right and the point of entrance of the gas might remain a mystery. Then again, the pressure of the waste-water coming from the upper stories of houses will often cause the escape of sewer-gas through a trap in the basement. From these facts we must acknowledge that there is a possibility of the passage of sewer-gas through sealed traps, and the fact that a trap keeps its seal is not proof positive that no sewer-gas has found entrance. But the escape of sewer-gas through sealed traps, can occur only when the sewers are not sufficiently ventilated. If they are properly ventilated, any pressure in the sewer will cause the gas to pass out through the points offering the least resistance, and this would be through ventilating pipes and not through sealed traps.

Now, as to the second objection to traps, *i. e.*, the possibility of a mold's extending through a sealed trap. There is but little evidence on this point. Dr. J. G. Richardson found in some new pipes in his house in Philadelphia a vegetable mold extending through a sealed trap. It is said by some that this is of no consequence, as this simple vegetable mold is not likely to cause any specific disease. But it must be plain that there is the possibility of disease germs attaching themselves to this mold and extending wherever the mold leads. Submersion in water will not destroy disease germs. Dr. Richardson suggests sterilizing the portion of the waste-pipe above and including the trap, by constant drippings of a solution of copperas; or, by having a stopcock a few inches below the trap, and turning this at night, fill the upper part of the pipe with a solution of copperas, one ounce to the pint of water. By this means all possibility of being poisoned by the vegetable mold or anything that it may carry would be prevented.

As to the third and most important objection against traps, *i. e.*, the probability of their being siphoned, I would refer you to the experiments made by Messrs. Philbrick & Bowditch, and also those by Waring. Full notices of these experiments have appeared in THE SANITARY NEWS. Suffice it to say here, that if the main waste-pipe extends above the roof and is open at the top, and the traps themselves are properly ventilated by pipes joining the waste-pipes at the crown of the trap, siphonage will rarely take place.

To conclude, if the sewers are properly and sufficiently ventilated, and the traps and waste-pipes are constructed as above stated, and attended to frequently, as they must be, we need have no fear of being poisoned with sewer-gas. Sewered cities, as imperfectly as the work is done in the majority of them, are healthier than those without sewers, and we believe that sewerage may be so perfect as to reduce the dangers to *nil*.

HOW TO DEAL WITH DIPHTHERIA.

Diphtheria is certainly to be greatly feared in city or country. Its ravages, the year round, are greater than those of small-pox; while there is a specific, in vaccination, for the prevention of the latter, the former comes into a family and, in spite of medical skill, secures its victims. There is no known prevention, except in sanitary precaution. The Board of Health in Philadelphia has prepared a set of rules and ordered one hundred thousand copies printed for distribution among the people of that city, among whom there have been this year 1,126 cases of the disease and 759 deaths. The rules say:

When a child or young person has a sore throat, a bad odor to its breath, and especially if it has fever, it should immediately be separated and kept secluded from all other persons, except necessary attendants, until it be ascertained or not if it has diphtheria or some other communicable disease.

Every person known to be sick with diphtheria should be promptly and effectually isolated from the public. Only those persons who are actually necessary should have charge of or visit the patient, and these persons should be restricted in their intercourse with other individuals. Children residing in a house where there is a case of diphtheria should not be permitted to attend school.

When a case of diphtheria is fully developed, the same precautions in regard to free ventilation, disposal and disinfection of discharges, bed or body linen, and so forth, isolation during convalescence (or management of the corpse should death unfortunately occur), ought to be enforced as follows: Have the patient placed in one of the upper rooms of the house, the furthest removed from the rest of the family, where is to be had the best ventilation and isolation. The room should be instantly cleared of all curtains, carpets, woolen goods, and all unnecessary furniture. Keep the room constantly well ventilated, by means of open windows and fires if necessary. Maintain the utmost cleanliness, both with regard to the patient and in the room. A basin charged with chloride or carbolate of lime, or some other convenient disinfectant, should be kept constantly on the bed for the patient to spit in. Change the clothing of the patient as often as needful, but do not carry it while dry through the house. A large vessel (a tub) containing water impregnated with a solution of carbolic acid in the proportion of four fluid ounces (Calvert's No. 4 or No. 5) to the gallon of water, should always stand in the room for the reception of all bed and body linen immediately on removal from the person or contact with the patient. Pocket-handkerchiefs should not be used, but small pieces of rag should be employed instead for wiping the mouth and nose, and each piece, after being once used, should be immediately burned. Two basins, one containing water impregnated with a solution of carbolic acid or permanganate of potassa, and the other containing plain water, and a good supply of towels, must always be ready and convenient, so that the hands of the nurse may be at once washed after they have been soiled by contact with the patient. All glasses, cups, and other vessels used by or about the patient should be scrupulously cleansed before being used by others. The discharges from the bowels and kidneys are to be received, on their very issue from the body, into vessels containing some disinfectant, as a solution of two pounds of sulphate of iron in a gallon of water, or four fluid ounces of carbolic acid (Calvert's No. 5) to a gallon of water, and immediately removed. No person should be allowed to enter the room except those who are attending upon the sick. Boiling is one of the surest ways of disinfecting all contaminated clothing. A solution of carbolic acid should first be added to the water. Any material which can not be washed without injury should be exposed to a dry heat of about 240 degrees, Fahrenheit, or fumigated in a closed chamber, as directed below. All articles which can be spared should be destroyed by fire. When persons have had the diphtheria, whether they get well or die, the room which they have occupied should be thoroughly cleaned and disinfected. The furniture should be washed with a strong solution of chloralum (three or four ounces to the gallon of water), or preferably, with carbolic acid soap. Afterward the floor and wood-work should be washed with carbolic acid soap or with chloride of lime and water, and the paper should be removed by moistening with chloralum or carbolic acid solution. Then, after closing the doors, windows, and all other openings, the room should be fumigated by burning sulphur in an iron dish and kept closed for several hours. Chlorine gas may be used instead, and may be generated by pouring strong sulphuric acid upon equal parts of common salt and binoxide of manganese, to which some water has been added. After this the room should be well aired for several days by throwing open the doors and windows, and then the ceiling should be whitewashed, and the walls repapered or whitewashed.

It is particularly important that persons whose throats are tender or sore from any cause should avoid possible exposure to the contagion of diphtheria. Children under ten years of age are in much greater danger of taking the disease, and after they do take it, of dying from it, than are grown persons. But adults are not exempt, and mild cases in them may cause whole series of fatal attacks among children.

Numerous instances are recorded where the contagion of diphtheria has retained its virulence for weeks or months in cesspools, heaps of decaying vegetable matter, damp walls, etc., and been carried long distances in clothing, in sewers, in waste-pipes from stationary wash-stands, and in other conduits. Hence all sewer connections and other carriers of filth should be well ventilated and disinfected, and children particularly should not be allowed to breathe the air of any water-closet, cesspool, or sewer, into which discharges from patients sick with diphtheria have entered, nor drink water or milk which has been exposed to such air.

Beware of any person who has a sore throat; do not kiss such a person, or take his or her breath; do not drink from the same cup blow the same whistle, nor put his pencil or pen into your mouth.

Do not wear or handle clothing which has been worn by a person during sickness or convalescence from diphtheria.

HEALTH IN MICHIGAN.

For the week ending November 18, reports to the State Board of Health, indicated that typhoid fever, pneumonia and neuralgia increased, and that bronchitis, tonsilitis, typho-malarial fever, diphtheria, intermittent fever, cholera morbus, diarrhœa and scarlet fever decreased in area of prevalence. At Lansing, the State capital, the prevailing winds during the week were west, and in comparison with the averages for the preceding week the temperature was lower, the absolute and relative humidity less and the day and night ozone more. Diphtheria was reported at twenty-four places, scarlet fever at thirteen and measles at three. Small-pox was reported at Niles and Grand Rapids. During the succeeding week ending November 25, influenza, diphtheria and inflammation of the bowels increased, and puerperal fever, dysentery and cholera morbus decreased in area of prevalence. The prevailing winds at the State capital were southeast and west, and the temperature was lower than during the preceding week, the absolute humidity and the day ozone less and the relative humidity and night ozone more. Diphtheria was reported at twenty-two places, scarlet fever at thirteen and measles at five. Small-pox was reported at Grand Rapids.

A WARFARE THAT ENDS IN EXTERMINATION.

Commencing at the mouth, the virulence of human saliva seems to have been proved. It is supposed to be due to micrococci. The human mouth is a culture chamber, which is maintained at a constant temperature, and is furnished with a constant supply of pabulum, namely, saliva. These circumstances are highly favorable to the sustenance and multiplication of the micrococcus. If, now, it is asked why every man does not suffer from auto-inoculation, it may be answered that micrococci may kill an herbiverous animal, a rabbit for instance; but cannot destroy a carnivorous or omnivorous animal as man. Most earnestly do we urge vegetarians to take timely warning! But what is to become of the genus *homo*, anyhow? Vibriones tickle his nose into hay fever, the Bacillus typhosus gnaws at his bowels, the micrococcus diphtheriæ swells up his throat or clogs his larynx with fatal croup, sarcinæ invade his stomach, and micrococci envenom his saliva. If he eats a bunch of grapes, he must needs crunch the parasitic saccharomyces adhering to the skins; and if he inadvertently exposes the contents of his pantry to the open air, a blue green mould from the Penicillium glaucum spreads itself over the best preserves; bubbles line the glass jars, and wriggling organisms and motionless forms looking like beads on a string, sour his milk. The greed of the yeast plant for oxygen is the cause of the raising of his bread, and the same craving on the part of the Mycoderma vini, supplies him with wine. But if he does not carefully watch these results of fermentation, mould gathers on one, and the other falls a

victim to the spores of the viscous ferment and becomes thick, ropy and unpalatable. If he indulges in pork, trichinæ nestle cosily in his tissues, or the Cysticercus cellulosus develops into twenty feet of tænia to the discomfort of his alimentary canal. In infancy and childhood, thread worms and lumbricoides disturb his sleep and torture him with colicky pains. Disease germs expose him to whooping cough and mumps, and threaten him with a long line of exanthemata; and when, the gauntlet run, he comes into youth, that fell destroyer, consumption, fed, if Koch is to be believed, by bacilli, leaves him but six out of seven chances of ever reaching the period of maturity. If, by good fortune, he escapes this danger, others meet him at every step. Through the parsimony and dishonesty of city officials, streets are filthy and sewers are imperfect. If he flies to the country, perchance a dry summer and an open winter permit the generation of miasmata. And even if he seeks the salubrious atmosphere of a sea resort, defective sanitation poisons his bedroom or permits the discharge from a drain to empty a few yards from his bathing place. And finally, when he falls a victim to disease fungi or, happily escaping them, dies of good old age, his mortal remains are no sooner consigned to the grave than a host of maggots and kindred scavengers complete the work of devastation, and thus does the man of earth become converted into the numerous bodies of his numerous destroyers. *Hahnemannian Monthly.*

ARTIFICIAL CHILD INCUBATION.

The report of some remarkable experiments in so-called artificial child incubation comes from France. *The Glasgow Mail* says that the immense success which has attended the artificial incubation of chickens in France recently attracted the attention of Dr. Tavernier, a learned and ingenious physician. He was attached to a hospital for foundlings, and was annoyed at the large number of foundlings who died within the first six months of their life. The majority of those admitted to the hospital were weak and sickly, and he resolved to try what "artificial incubation" would accomplish if applied to infants. The doctor constructed a child incubator on precisely the model of the ordinary chicken incubator. It was a box covered with a glass slide, furnished with a soft woolen bed, and kept at the temperature of 86 degrees, Fahrenheit, by the aid of hot water. He selected as the subject of his first experiment a miserably-made infant, one that had come into the world at an injudiciously early period. This infant was placed in the incubator, provided with a nursing bottle, and kept in a dark room. To the surprise of the doctor, it ceased to cry on the second day after it was placed in the incubator, and although it had previously been a preternaturally sleepless child, it sank into a deep and quiet sleep. The child remained in the incubator for about eight weeks, during which time it never once cried, and never remained awake except when taking nourishment. It grew rapidly, and when, at the expiration of sixty days, it was removed from the incubator, it presented the appearance of a healthy infant of at least a year old. Delighted with the success of the experiment, Dr. Tavernier next selected an ordinary six-months-old infant addicted to the usual pains and colic, and exhibiting the usual fretfulness of French infants. This child conducted itself while in the incubator precisely as its predecessor had done. It never cried; it spent its whole time in sleep, and it grew as if it had made up its mind to embrace the career of a professional giant. After a six weeks' stay in the incubator it was removed and weighed; during this brief period it had doubled its weight. It had become so strong and healthy that it resembled a child three years old, and it could actually walk when holding on to a convenient piece of furniture. These two experiments satisfied Dr. Tavernier of the vast advantages of artificial child incubation. He immediately proceeded, with the permission of the authorities of the hospital, to construct an incubator of the capacity of four hundred infants, and in this he placed every one of the three hundred and sixty infants who were in the hospital on the tenth day of February last. With the exception of one who died of congenital hydrocephalus, and another who was claimed by its repentant parents, the infants were kept continuously in the incubator for six months, when they were removed in consequence of having outgrown their narrow beds. The result will seem almost incredible to persons who are unfamiliar with the reputation of Dr. Tavernier, and have not seen the report made to the French Government on the subject by a select committee of twelve. The average age of the infants last February was 8 months and 3 days—the youngest being less than 12 hours old and the eldest not more than 11 months. Their average weight was 16 pounds, only 1 of the entire 360 having attained a weight of 32 pounds. At the end of six months of artificial incubation the average weight of each infant was 24 pounds, and there was not one who would not have been supposed by a casual observer to be at least three years old. In other words, six months of artificial incubation did as much in the way of developing Dr. Tavernier's foundlings as three years of ordinary life would have done. The infants were strong and healthy as well as big; they walked within a week of leaving the incubator, and most of them have since learned to talk. These results surpassed Dr. Tavernier's most enthusiastic expectations, and there can be no doubt that his system of artificial child incubation will be adopted not only in every child's hospital in France, but in every private family throughout the civilized world.

COOK COUNTY VITAL STATISTICS.

The following are the vital statistics for Cook County during the year 1881: Total number of deaths, 14,871; males, 8,015; females, 6,849; not stated, 7; whites, 14,661; colored, 166; not stated, 44; Americans, 11,107; foreigners, 3,687; not stated, 77; single, 10,996; married, 3,172; widowers, 204; widows, 417; not stated, 82; in Chicago and county towns of more than 5,000 population, 14,429; in towns of less than 5,000 population, 350; in towns under 500 population, 92; under 1 year of age, 4,372; from 1 to 5 years of age, 3,413; from 5 to 10 years of age, 1,121; from 10 to 15 years of age, 427; from 15 to 20 years of age, 449; from 20 to 30 years of age, 1,367; from 30 to 40 years of age, 1,036; from 40 to 50 years of age, 904; from 50 to 60 years of age, 705; from 60 to 70 years of age, 596; from 70 to 80 years of age, 353; from 80 to 90 years of age, 91; over 90 years of age, 23; not stated, 24. In January there were 1,024 deaths; in February, 892; in March, 868; in April, 1,004; in May, 1,360; in June, 1,071; in July, 1,935; in August, 1,931; in September, 1,377; in October, 1,198; in November, 1,053; in December, 1,148.

NOTES AND NEWS.

LIGHTING.

Prof. Siemens calculates that it will cost £14,000,000 to lay down the requisite plant to supply the whole of London with the electric light. If all the towns in Great Britain and Ireland were to demand to be supplied with the new illuminant, the capital outlay would be £64,000,000, not including £16,000,000 for lamps and internal fittings. After this expenditure had been incurred the relative cost of electricity to gas of the same illuminating power would be as 29 is to 22.

The Western Underground Electric Wire Company of this city has obtained a charter, and its capital stock of $250,000 has all been subscribed for. The company expects to get an ordinance from the city, when it will proceed to run the wires in tubes under the sidewalks. The company proposes to light buildings in the central part of the city first.

A man drawing a telephone wire across one of the electric wires in Rock Island received a shock which caused him to fall to the ground, a distance of twelve feet, like a log. The electricity burned a yellowish scar across the palm of his hand, but otherwise he appeared to be uninjured.

Seven private companies have applied to the authorities of Edinburgh for permission to supply electric lighting for the city and all have been refused on the ground that it was undesirable that any power over the streets should be given to any one except the corporation itself.

The city of Rock Island, Illinois, is now illuminated by twenty electric lamps on the towers. The towers cost $6,825, and the contract for lighting calls for $7,500 a year for five years.

The electric light at Fairfield, Iowa, is said to be so brilliant that a man can note the time by his watch half a mile away from the tower.

Mr. Edison, who is in London, intends, it is stated, to illuminate with the electric light the West London Tabernacle, Notting-hill.

WATER SUPPLY.

The contract for furnishing 1,400 feet of 6-inch cast-iron water-pipe for Wabash avenue has been let by the Hyde Park authorities to the Cincinnati and Newport Iron Pipe Company at $38 per ton.

A special election will be held at South Evanston on the 23d to settle the question of a separate water system. The cost of the improvement is to be limited to $25,000.

FOOD ADULTERATIONS.

Five grocers have been arraigned in New York city for selling adulterated cream of tartar. It was alleged that the article is adulterated with gypsum. The complaint is under a law passed May 28, 1881.

A farmer sending milk into Glasgow was recently fined £12 for adulterating milk. The sweet milk was found to contain 16 per cent. of water, and the skim milk 9 per cent.

SEWERAGE.

The attorney for the town of Hyde Park has been instructed to prepare an ordinance, for the construction of a 2-foot brick sewer on State street, from Forty-third to Forty-fifth street.

MISCELLANEOUS.

Brick-making along the Hudson river is one of the great industries of the state. There are about 160 yards, varying in capacity from 25,000 to 140,000 bricks per day. The daily make is about 8,000,000, or for the season of six months, 1,092,000,000. Counting a brick eight inches in length, this production would lay a walk six bricks wide around the earth. For labor these yards pay nearly $3,000,000 in the course of the season, wages ranging from $1,25 for small boys to $3,50 per day for the best men. Four cords of wood burn 30,000 bricks, and it is estimated that 166,401 cords of wood at $5 per cord will be used this year. In case all the bricks made this season shall be marketed the production will yield in gross $6,825,000.

A firm of London engineers have patented an invention for extinguishing fires in theatres. They propose so to arrange gas-pipes all over the building as to be able to turn them into water-pipes at a moment's notice. That is to say, by touching a lever the gas is forced out and replaced by water, which will pour down upon the fire. The invention allows of the water being directed to any particular part of the theatre, so that behind the foot-lights where the out-break generally occurs the gas-pipes might be turned into water-jets without affecting the lights in other parts of the building.

The annual death-rate in London during the last week for which reports have reached this country was 20. In Glasgow, during the same week, it was 29.

An ordinance was passed at a recent meeting of the town trustees of Hyde Park regulating the cleaning of cess-pools and out-houses.

BUILDING INTELLIGENCE.

CHICAGO.

The lease for the ground at the southwest corner of Clark and Washington streets will expire May 1, 1884. It is now occupied by the unsightly Exchange block, which is now and always has been, in such an unsanitary condition that the lives of all who inhabit it are imperiled. The site is one of the best in the city. It is said that the Messrs. Peck, its owners, will remove the old hulk at the expiration of the lease and that there will be erected a structure worthy of the location. The present building cost only about $50,000, and for years its owner received an annual rental equal to this amount.

A house costing $11,000 is being built for Mrs. L. A. Herrick at No. 28 Newberry avenue, three stories high and 30x80 feet in size. The front is in fancy brick, brown stone, and terra-cotta panels, presenting a fine appearance. A piazza eight feet wide extends nearly across the front, with slate and ornamental columns. The house has modern division into thirteen large rooms. An ornate bay window projects over the piazza at the second floor and above. This is a recessed arch forming a large balcony above the bay. The house finishes in a gable occupying the entire width.

Mr. J. O. Smith, a Chicago merchant, is having a handsome villa built at Winnetka. It is a frame building with brick cellar, 38x50 feet, two stories and attic. On the first floor is a grand reception and staircase hall, leading to a parlor, sitting-room, and dining-room, beyond which is the kitchen, etc. On the second floor are four large chambers. The house will be finished by June next, at a cost of $8,000.

Messrs. Edbrooke & Burnham are building a flat, three stories high 20x70 feet, rock-faced brown stone, brick and terra-cotta elevations, on Warren avenue, opposite Union Park, for Edgar S. Heaton, to cost $8,000. A handsome feature is a hanging bay in brown stone at the second floor. The front terminates in a gable fifty feet from grade. The flats are each 20x70, containing eight rooms each and bath.

HYDE PARK.

The United States Rolling Stock Company has definitely decided to locate its business at the junction of the Grand and Little Calumet rivers, in the southern part of the town of Hyde Park, and about twelve miles south of Chicago. The rail and water communications will be unusually ample, as the lake can be reached directly, and no less than five through lines of railroad now cross or will extend branches to the property. The president of the company says that a new town, similar to that of Pullman, though not on so extended a scale, will be established for the benefit of the workmen. It will have the same model sewerage, water and street systems, the water being obtained directly from Lake Michigan. The workmen's houses will be well and conveniently located, and after sanitary methods. The "plant" will represent an investment of about $500,000.

EVANSTON.

The beautiful northern suburb of Chicago, Evanston, is said to be in a most prosperous condition. Mr. W. D. Hitchcock has recently built a fine brick house at a cost of $12,000, on Maple avenue. On Maple avenue, near Grove street, Mr. J. H. McCall has a recently-completed Queen Anne house, which is in original and tasty design. On Hinman avenue houses have been built by Messrs. Stockton, Parkhurst, Sargent, Reed, Kimball, Vose and others. On Greenwood street, near Maple, Mr. R. L. Dakin, of the Merchants' National Bank, is planning the erection of a stylish house next Spring. Mr. George B. Dunham will also build on that street.

BUILDING PERMITS.

The following is a list of all new buildings in Chicago for which permits have been granted during the past two weeks, giving location, size, cost and name of owner. All buildings are of brick unless otherwise specified :

Robey and Thirteenth Place, 2-story dwelling, 24x40, $2,000; F. Watson.
Prairie ave. near 37th, 2-story dwelling, 23x36, $2,500; Mrs. C. E. Turner.
N. Clark near Garfield ave., 3-story flats, 48x59, $12,000; George Bartholomae.
Third ave. near Taylor, 3-story flats, 25x104, $12,000; W. C. Seipp.
129 Lytle, 2-story dwelling, 20x40, $3,000; Mrs. B. A. Moss.
Wabash ave. and 26th, 3-story school building, 90x120, $80,000; Board of Education.
64 Ohio, 1-story foundry, 50x52, $5,000; J. Hall Dow.
67 Hill, 2-story barn, 37x34, $5,000; Keene Chapell.
458 Congress, 2-story dwelling, 22x50. $3,000; James W. Dwyer.
208 to 214 Randolph, additional story, $8,000; John Borden.
51 to 55 Dearborn, additional story, Hannah Busley.
South Park ave. and 29th, 2-story store and dwelling, 23x60, $5,000; William Zahnn.
293 Cenler ave. 2-story flats, 24x58; $4,000; William McCarthy.
2638 Prairie ave., 3-story dwelling, 27x74, $12,000; C. L. Hutchins.
2641 Prairie ave., 3-story dwelling, 25x77, $12,000; C. S. Hutchins.
413 and 417 Fifth ave., two additional stories, 60x100, $3,000; E. H. Preston.
814 Washtenaw ave., 1-story cottage, 20x30, $1,500; R. Tennant.
3863 to 3872 Cottage Grove ave., 3-story store and dwelling, 56x56, $14,000; Robert Excell.
653 and 655 Jefferson, 2 2-story dwellings, 44x44, $4,000; John Duffey.
210 W. Twelfth, 3-story addition to store; 23x40, $2,000; William Pullen.
515 and 517 Twenty-fifth, basement. 48-60, $1,000; M. Eisten.
485 Ogden ave., 3-story store and dwelling, 24x100, $10,000; F. B. Clarke.
9 Warren ave., 3-story dwelling, 20x70. $7,500; E. S. Heaton.
3140 Fifth ave., basement, 20x40, $8,000; Thomas Bowers.
630 and 632 N. Franklin, 4-story factory, 50x125, $25,000; A. B. Fiedler.
2820 Deering, 1-story cottage, 20x40, $1,000; M. Gregon.
2918 Butler, 1-story cottage, 20x40, $1,200; Turner & Bond.
Winthrop Place near Polk, 2-story dwelling. 22x34, $3,000; John Hogan.
87 Alexander, 1-story building shed, 18x40, $400; Godfried Brewing Co.
3008 Emerald ave., 1-story cottage, 20x30, $1,000; Fred Flamm.
205 Madison, 5-story store, 26x170, $30,000; Jonathan Clark.
116 Superior, 2-story store and dwelling, 23x90, $7,000; M. Brand.
764 Adams, 2-story dwelling, 23x60, $4,000; H. B. Owsley.
Lake Park ave. and 31st, 5 3-story dwellings, $106x40. $30,000; Dr. H. Merckle.
3821 Lake ave., 2-story dwelling, 21x50, $3,500; E. Williams.
299 Webster, 2-story dwelling, 21x44, $2,000; F. Annen.
20 Plum, 1-story cottage, 21x50, $2,500 Dennis O'Brien.
3453 Ashland ave., 1-story cottage, $400; John Vail.
206 Walnut, 2-story dwelling, 22x50, $2,700; B. McCarthy.
746 W. VanBuren, 2-story store and dwelling, 23x50, $5,000; C. T. Tyrrell.
3630 to 3636 State, 2 3-story stores and dwellings, 72x60, $20,000; Philip M. Thompson.
103 and 105 Hoyne ave., 2 2-story dwellings, 47x50, $10,000; James Sinclair.
239 Morgan, basement, 20x36, $700; A. B. Baldwin.
220 Sherman, 2-story dwelling, 22x40, $2,500; M. J. White.
2918 Dashiel, 1-story cottage, 20x34, $1,000; M. Matejka.
85 Walton Place, 3-story flats, 22x60, $6,000; August Lutz.
Elk Grove near Waubansia, 2 1-story cottages, 20x30 each, $2,000; W. F. Thomas.
147 Michigan ave., 2-story stable, 26x180, $4,000; Caryl Young.
403 North ave., 1-story cottage, 20x30, $1,000; G. D. Pease.
983 Twenty-first, 1-story cottage, 20x30, $1,000; J Slosson.
59 N. Clinton, 1-story shop, 20x25, $400; Thomas Allen.
265 Wells, 3-story flats, 34x60, $8,000; Samuel Burnell.
197 and 199 W. Monroe, 2-story stores and flats, 38x40, $2,200; S. P. Parnley.

The Sanitary News.

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CONTENTS.

CURRENT TOPICS:
- Difficulties in Getting a House Properly Built ---- 49
- Unparalleled Defects in Drainage and Ventilation ---- 49
- Injustice of Making Sweeping Charges Against Plumbers ---- 50
- How the Plumbers May Benefit Themselves ---- 50
- A Vear's Work of the Illinois State Board of Health ---- 50
- Instructing Undertakers at a Medical College ---- 51
- Sanitary Science as a Part of Medical Instruction ---- 51
- Obstructing the Streets of a City ---- 51
- Injuries Resulting from the Use of Patent Medicines ---- 51

TENEMENT HOUSES IN AMERICA ---- 52
IMMIGRANTS AND SMALL-POX ---- 53
THE DRAINAGE OF A PUBLIC BUILDING—(Illustrated) ---- 54
THE RUTTAN SYSTEM OF VENTILATION—(Three Illustrations) ---- 56
THE MASTER PLUMBERS' ASSOCIATION ---- 59
HEALTH IN MICHIGAN ---- 59
THE NEW LIBRARY ROOMS AT PULLMAN ---- 59
CURRENT PUBLICATIONS ---- 59
NOTES AND NEWS:
- Water Supply ---- 60
- Chicago Sewerage ---- 60
- Miscellaneous ---- 60

BUILDING INTELLIGENCE ---- 60

THE difficulty of getting a house built to one's satisfaction is well illustrated in the experience of a West-side gentlemen, who has just completed a comfortable home. He gave his architect most definite instructions, but he soon found that hardly anything was being done as he had directed. Nobody employed about the building seemed to manifest the slightest interest in his work, and bricks and boards were put together with the utmost disregard of the fitness of things. Lumber was wasted as though it were to be had for the handling. The gentleman came to the conclusion that it would be advisable to stay about the premises, and he did so most of the time, watching as many of the movements as he could. The result was that each day usually opened with tearing down or pulling apart the work of the day previous. For example, he thought he saw something wrong in the laying of the main drain for the sewerage. He reported to the architect, who was to be held responsible for defects. The workmen insisted that everything had been done just exactly as it should have been. The drains were dug up, nevertheless, and it was found that no connection had been made with the street sewer at all. The last section of pipe had been too short by several inches, and to the crafty drain-layer, who was interested in saving time and material, it was not considered necessary to lengthen it. The fresh air-duct leading to the furnace had been ordered built of unusual capacity, for the reason that the owner wanted none of the common difficulty about getting sufficient air to ventilate as well as warm his house. He watched the work on this air-duct very closely, and was congratulating himself that it had been well made, but, at last, discovered that the workman was narrowing the inlet by drawing in each succeeding course of bricks as he neared the top. When remonstrated with, he said he thought he was doing the proper thing, as the duct wouldn't let in so much cold air if smaller! So in everything done about the house—the workmen had no more conception of the purpose which a healthy, comfortable and convenient house was to serve than the tools which they used. By hiring an architect to watch them, and then watching the architect himself, he succeeded at length in getting a house in which he takes some pride; but it was at the expense of extra funds, much valuable time, and patient waiting.

THE report elsewhere of the condition of the County Jail and Criminal Court Building in this city comes far short of the whole and exact truth. It would be a long story to relate all the defects, and words can not give more than an indefinite impression of the reality. If the defects in the plumbing and sewerage were confined to the men's apartment of the jail alone—the only portion of it which is described in the report—it might not be thought strange that remedies were not sooner provided. Anything might be considered good enough for criminals, and a little punishment in the way of sewer air for breathing and warming purposes might be quite proper. But the fact is that the traps in all pipes in the building were removed some years ago, and, ever since, the jailor's room, private offices, kitchen, laundry and bath-rooms, as well as the women's and boys' apartments, in the jail proper, have been receiving-chambers for gases sent direcly upward from the sewer or cesspool through sinks, wash-basins, urinals, and bath-tubs. What ever saved them from the terrible effects of sewer-gas poisoning can not readily be imagined. It may be that sewer-gas is not so poisonous as often represented after all. Still, there might have been the same objection to breathing these foul odors that one would have if compelled to spend his time in one of our level, pent-up sewers itself. In the Criminal Court Building the condition of things is not quite so bad, as modern closets have been put in recently, and some of the waste-pipes trapped. The proposed ventilation of the buildings, by the so-called "attic system," may have been well enough in theory, but it proved, in practice, an absolute failure, and the expensive apparatus put in has been unused from the first, and is now falling into decay. The underground air-ducts have been in turn hiding-places for rats and sewage cesspools. The sewers have become repeatedly clogged and not relieved of their obstructions until the sewage overflowed the cesspools or leaked through the walls of the sewers themselves, filled the air-ducts and flowed back into the engine-room and actually stopped the engine. Still nobody had sense enough to discover the cause of the trouble, and it was allowed to repeat itself again and again. Some of the large

traps which disconnect the street sewer from the drains were found, on the recent examination, practically obstructed, and it would not have been long before the sewage would again have sought the engine-room. To prevent any future inundation the engineer has connected his pumps with the main air-shaft and, when he discovers the tide coming in, he sets them at work. The absolute indifference to the condition of the basement is well illustrated in this fact: In the rounds of the recent inspection the shriveled remains of a rat were found hanging by one of its legs from a fixture in the wall, between which and the wall it had been caught, unable to free itself. The skeleton, covered only with a skin, hung within a few feet of the opening of one of the hot-air shafts. The neglect of this building is one of the many sins to be charged up against the County Commissioners; but their time has been fully occupied in "taking care" of the friends who helped elect them to office. Employés state that they have repeatedly asked for an improvement of the drainage, but never had a willing listener. The present board is likely to accomplish something, a sanitary engineer having been employed to make a thorough examination and recommend what shall be done. Hereafter, the plumbing and drainage of the county buildings should be entrusted to a responsible and capable man, and he be held responsible for their condition from year to year.

The Sanitary News has already had something to say about the injustice of making sweeping charges of dishonesty and ignorance against plumbers; but the subject will bear further discussion. That there are so-called plumbers who know but little about the trade they profess to follow, and who will not hesitate to do rascally work, no one need deny; but that unscrupulousness and ignorance are characteristic of the craft is untrue. The majority of the plumbers of this city are men of integrity and possessed of such general information as will be found among men of business generally. Indeed, many of them have given time to the study of books which other business men never think of doing. One of them was found, a few days ago, to have in his possession a rare and valuable French publication on hydraulics, which he had discovered on the shelves of a book-store and purchased at considerable expense, and which he was exploring with all the eagerness of the professed literator. There are plumbers who have technical, as well as practical, knowledge about their business, and they are eager to increase their information. This is indicated in the line of work laid out by the Master Plumbers' Association, recently organized. Papers are read at the regular meetings on subjects of interest, and intelligent and earnest discussions follow. Personal information and experience become common property, and an inclination to profit by new ideas is manifested. It is now proposed to give a course of public lectures on sanitary subjects by the best talent that can be secured. Prof. S. A. McWilliams, of the College of Physicians and Surgeons, has consented to give the opening lecture at an early date. As to the suspicion which unreasonably attaches to the trade, a plumber said recently: "I am tired of this business—I hate it. I have spent the best part of my life in it, and have endeavored to deal fairly with every man. I am still poor, working hard to support my family. It is not this I complain of, but, in spite of my record and all my arguments, I am looked upon with suspicion, simply because I am a plumber. I wish the public might know something about our business—what our material costs us; how difficult it is to keep a force of men, whom we pay daily wages, economically employed on the odd jobs given us here and there, and they wouldn't complain of our alleged extortions."

The Master Plumbers' Association can do much toward removing this feeling of hostility on the part of the public by emphatically denouncing all bad plumbing and those who are guilty of doing bad, or dishonest, work. The lack of discrimination, on the part of the public, between reliable and unreliable plumbers is due to the almost universal lack of knowledge of what constitutes good plumbing. The Association has it in its power to weed out the disreputable and ignorant and brand them so unmistakably that they will be compelled to leave the city. Let the Association resolve that it will expose every piece of rascality that comes to its notice, and, indeed, co-operate with the Health Department in seeking out defects, sparing no guilty plumber the widest publicity of his disgrace, and they will at once have the confidence of the community. Let them go further than this and refuse to have anything to do with contractors, or builders, or architects, who seek their services at prices less than the cost of material and a proper return for legitimate labor, their motto being, "Good work or none." Let them, in addition to this, expose any man who takes a job at a positive loss, if an investigation shows that he has endeavored to "save himself" by fraud. The Association can not afford to countenance bad work either by protecting those who have been exposed, or failing to discover who among their craft are bringing disgrace upon all. A danger which the Association has to avoid is that it may degenerate into a mere Union. A warfare carried on behind closed doors by a band of oath-bound friends can not result in ultimate good even if it have any result; but the fight for a principle with the community as interested spectators, if not active participants, is profitable in the end, as well as immediately and always honorable.

In the Fourth Annual Report of the Illinois State Board of Health—for the year ending September 30, 1881,—it is shown that during the four years of the existence of the Board, twenty different sessions for the examination of non-graduate applicants for licenses to practice medicine have been held. Of 600 candidates, 202, or about 30 per cent., passed satisfactory examinations and were given certificates. State medical practice certificates were issued during the last year to 510 physicians, of which number 481 were based upon diplomas of reputable medic l colleges; 18 upon length of practice in the State prior to the passage of the Medical Practice act, and 11 upon the result of examination by the Board. This makes a total of 6,561 certificates issued to practitioners since the organization of the Board. A total of 674 certificates has been issued to midwives. There is an average in the state of about one physician to every 570 inhabitants. Under the operation of the Medical Practice act so many quacks and unqualified prac-

titioners have been driven from Illinois into other states that the latter have been specially aroused to the necessity of self-protection, and an increasing number are now moving to secure the necessary legislation. As a pioneer in this movement, the Illinois Board is frequently applied to for information and advice on the subject. Only fifteen states have thus far enacted laws regulating the practice of medicine—Alabama, California, Delaware, Georgia, Illinois, Kansas, Louisiana, Maine, Maryland, Mississippi, New York, Pennsylvania, West Virginia, Wisconsin and Texas. In addition to the special attention paid to small-pox, other strictly sanitary work of the Board was the sanitary care and policing of railway stations, action with reference to the dangers of summer resorts, the sanitation of railway travel, the regulation of the transportation of corpses in the state, the vaccination of railway employés, the suppression of epidemic diseases, the promotion of local health organizations, remedies for river pollution, investigations into the causes of excessive death-rates in certain localities, with suggestions of relief, etc., entailing a large office correspondence, as well as numerous personal visits to various localities. On the subject of small-pox alone there were written 951 letters of special advice and instruction. The total expenditures of the Board for the year were $5,754.25. Appended to the report is an account of the recent exposure of the bogus Massachusetts Bellevue Medical College, which has made the round of the daily papers.

THROUGH the instrumentality of Dr. Oscar C. DeWolf, Commissioner of Health, a new departure has been taken—or undertaken—at the Chicago Medical College in giving a course of lectures to those who officiate at funerals. The undertaker has a solemn responsibility resting upon him, and there is such a thing as scientific undertaking. It is not an unusual thing to have bodies embalmed now-a-days, and it is not impossible to preserve them for a considerable length of time. To know how to embalm successfully, the undertaker must know the effects of certain chemicals upon the tissues of the body, and how to inject them. The latter involves a knowledge of the position and size of the arteries, and how they may be operated upon. The use of disinfectants, too, forms an important part of an undertaker's duty. Some incidental information about the cause and effect of decomposition would prepare an undertaker to give advice about the time and place which would be best for holding a funeral. The lectures given comprise a course in anatomy, the lectures being given by Dr. Billings, Demonstrator of Anatomy, and a brief course in chemistry, under Professor Hatfield, Professor of Chemistry. About thirty undertakers of the city are listening to the lectures.

THE Chicago Medical College has also taken an important step in advance in giving its students an extended course of lectures on State medicine. These are delivered by Dr. DeWolf and embrace information concerning the introduction, spread and restriction of small-pox; vaccination and the propagation of vaccine virus; the prevention of epidemic and pestilential diseases, etc., and, quite as important as anything, sanitary living as applied to the individual. This last embraces the subject of the proper location and construction of a house; the effect of the ground air and ground moisture upon the health, and the consequent necessity for thorough drainage of the soil; the construction of house drains, their defects, and how they may be discovered and remedied; ventilation and heating, and personal habits. These lectures comprise a course of thirty-four. This is probably the first medical college in the country to make the study of sanitary science an important part of its curriculum. Other institutions give a lecture or two, perhaps, on how to keep people from getting sick, but their attention is devoted mainly to dosing and the use of the knife. It has hardly dawned upon the mind of the average physician, or professor, yet, that the doctor has anything to do with health; his mission is to deal with disease. However, it would be professionally suicidal to warn their patrons against the dangers which lurk in sewers and cesspools, foul air and poisoned food.

WITH the complaints about the obstruction caused to travel in New York by the work of laying steam-pipes in the streets, *The American Architect* discusses the expediency of constructing subways through the more important streets, "with the idea of renting the use of them to such individuals, or corporations, as may be willing to pay for the privilege." This is a matter that interests Chicago, because, as in New York, these underground passage-ways "would be available for conveying gas, steam and water-pipes, and pneumatic tubes, such as are now employed for various uses; while telegraph, telephone and electric-light wires, which must before long be banished from the streets, would find the best possible accommodations in the same space. As the gas and steam-heating companies would save an immense sum, both in cost of laying pipes and in maintenance, by being allowed to carry their lines through an open and convenient passage-way, they could afford a high price for such accommodation, and the proprietors of electrical wires would be eager to share their privileges; while the public, by a judicious outlay, might thus in the end gain, not only a certain return on its investment, but a great further advantage in the abolition of overhead wires, and the substantial prevention of street excavations, with their consequent injury to pavements and discomforts of all kinds."

PROF. A. B. PRESCOTT says that the use of patent medicines without a knowledge of their composition does injury to the health of the people, for the following reasons: (1) They may, and in fact sometimes do, contain powerful or poisonous articles unsuspected. (2) They always may be, and often are, inert, and become a false reliance to the neglect of other and due measures in the care of health. (3) They are liable to be changed in composition, so that any experience of their effects as they are purchased at one time is not conclusive as to the same named articles purchased another time. (4) It is submitting health to the treatment of a distant and irresponsible stranger, and learning to hazard health in an apparent game of chance. (5) They are trusted to act as antidotes to disease in the sense in which no medicines can antidote disease. (6) They favor excessive recourse to medication and thereby increase the resort to physicians.

"TENEMENT HOUSES IN AMERICA."

"Tenement Houses in America," is the subject of an article published in *The Lancet* (London), of December 9, and written by Henry A. Burdett, M. P. Although the title and a foot-note indicate that the author will have something to say hereafter about the tenement houses in other cities of this country, he devotes this first article entirely to Chicago, and it is significant that he pays the city, in a general way, and Dr. DeWolf, Health Commissioner, particularly, very high compliments. The Hon. Mr. Burdett is not only a member of Parliament, but one of a commission appointed by that body to study the question of domestic sanitation. Representing that commission, Mr. Burdett came to this country, in company with Dr. Carpenter, last Summer, and, in September, visited Chicago. He then manifested extreme surprise and interest in what was pointed out to him, with reference to the sanitary affairs of this city. Dr. Carpenter was unable to come West, and remained in Philadelphia during Mr. Burdett's visit here. The latter afterward said to him that he would fail largely in his mission if he did not come to Chicago. Mr. Burdett now, in so influential and widely-circulated a journal as *The Lancet*, bids those "who are striving for improvement in these matters in England," and "any one who desires to have a model set of forms and regulations for controlling the health arrangements of a large town, to write to Dr. DeWolf for those in use at Chicago." "The whole plan of administering the Health Department of Chicago," he says, "has been admirably conceived, and is being ably administered by Dr. DeWolf, the present Commissioner of Health." THE SANITARY NEWS has already called attention to the fact that Chicago is in advance of other cities in the matter of the inspection and control of tenement houses, as well as in other branches of the health service. Proper recognition of this fact has now come from a country and a city which made sanitary science a study, and gave its principles practical application, many years before Chicago came into existence. Mr. Burdett's article is given below in full:

It is popularly supposed that in the large towns of America there are no poor, in the English meaning of that term. This is, however, a great mistake, and as a matter of fact some American cities contain as degraded specimens of the class of people to be found in tenement houses in Great Britain as will be met with in any part of the world. It may be interesting to inquire how it is that the New World, where labor is at a premium, and where there is more work to be done than hands to do it, no improvement has taken place in that class of persons who inhabit tenement houses. In a town like Chicago, which has been nearly rebuilt during the last ten years, the cause of the existence of the worst class of tenement houses is due to the fact that the enormous number of emigrants who annually enter the capital of the West, far exceeds the capacity of builders and capitalists. Hundreds of new houses are erected annually, but an influx of sixty or eighty thousand emigrants renders it impossible to provide suitable house-room for all. In spite of many difficulties, however, it must be confessed that the health authorities, under the energetic superintendence of Dr. DeWolf, the able Commissioner of Health, have done great public service. Mainly at their instigation, and in spite of considerable opposition from various quarters, powers have been conferred upon the health authorities which, as they are vigorously exercised, have proved the greatest boon to the inhabitants of Chicago. The following are the chief sections of an Act for the regulation and inspection of tenement and lodging-houses and other places of habitation, which was approved and put in force on and from May 30, 1881. The Act applies to all incorporated cities of fifty thousand inhabitants within the State of Illinois:

1. Architects, builders, or other persons interested in any projected tenement, lodging-house, or other place of habitation, must submit plans and specifications of any such building to the Health Commissioners, to enable them to examine, approve, or reject the same, unless, or until, adequate provision is made for the ventilation of rooms, light and air-shafts, windows, ventilation of water-closets, drainage and plumbing.

2. Every plumber interested in the plumbing work of such buildings must receive from, and proceed according to the specifications and written instructions of the Health Commissioners before commencing work.

3. The plumber is compelled, after the completion of his work, and before any portion of it is covered up, to notify the Commissioners in writing that the buildings are ready for inspection, and it is unlawful for any person interested to cover up, or in any way conceal, such plumbing work in or about any such buildings until the Health Commissioners have approved it.

4. Provision is made to impose a penalty for every such offense of from £20 to £40 upon any architect or builder who fails to comply with the foregoing regulations.

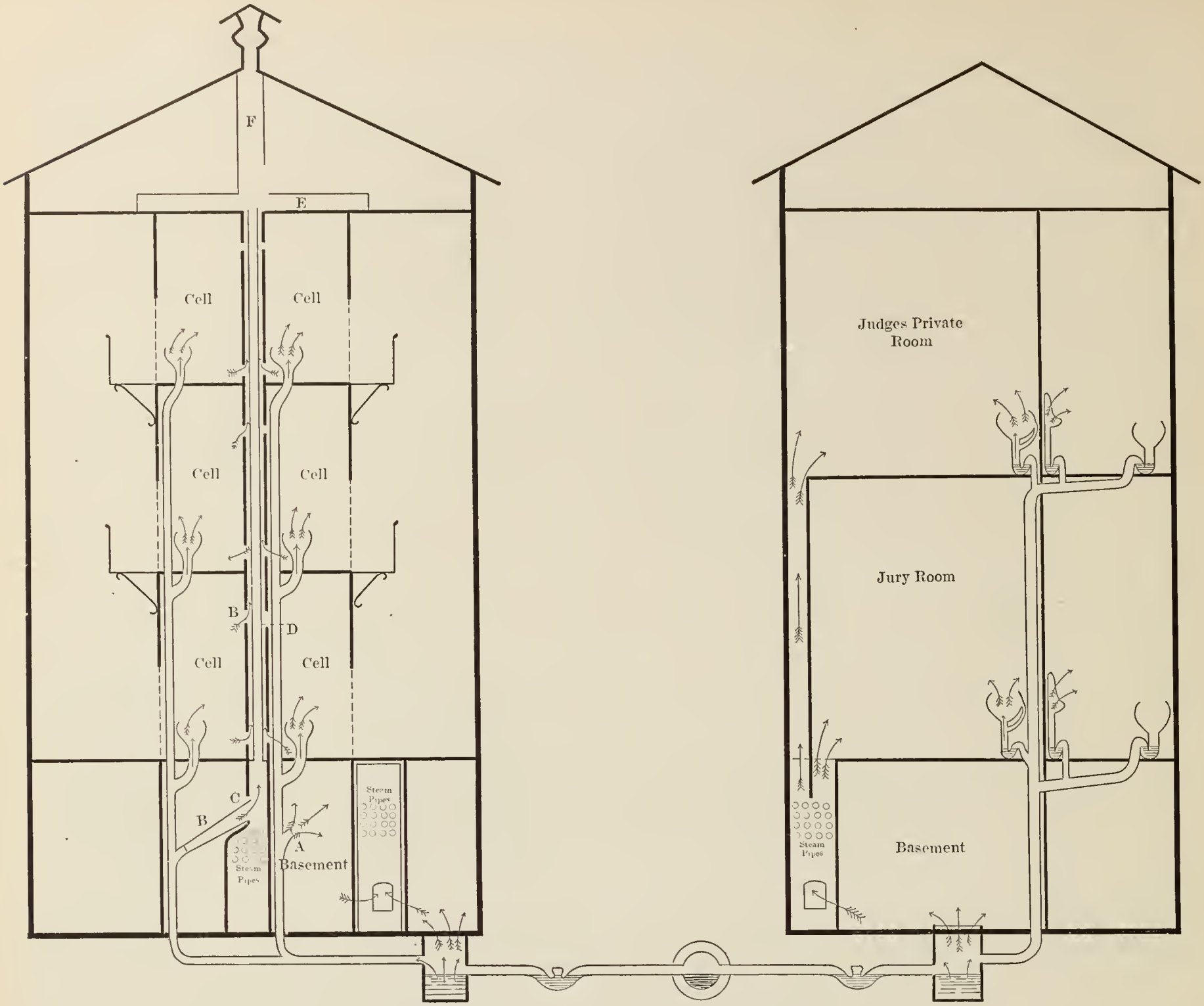
5. A similar penalty is imposed upon plumbers in case they fail to comply with the law, together with a further penalty of "£2 for each and every day such plumber shall, after first conviction, neglect or refuse to obey the Act or the written instructions of the Health Commissioners," with a forfeiture of his license to do business in the said city for one year after conviction for a second offense.

With the view of facilitating the application of the above Act various printed forms have been prepared by the Health Department, which provide (a) plans for ventilation, light, plumbing and drainage; (b) permit signed by the Health Commissioner sanctioning the erection of buildings on the following, or some special conditions in certain cases: (1) Every habitable room must have at least one window opening directly upon the street or yard, or upon a court, or light-shaft. (2) Every light and air-shaft for habitable rooms must be at least twelve feet square in area for a three-story house, sixteen square feet for a four-story house, and twenty square feet in area for a five-story house; and, in every case, not less than two feet wide in the clear. Shafts between two houses and common to both must be double this area. (3) All windows which open on shafts shall be hung with weights so as to slide vertically, each window being not less than twelve square feet in area. (4) Water-closets shall not be ventilated by a shaft which ventilates habitable rooms where they do not open otherwise to the external air. Water-closets must be ventilated by means of a separate shaft, not less than three square feet in area, to extend above the roof, and to be arranged for the admission of light and air at the top. (5) No alteration in

the light and ventilation of the premises (for which a permit is granted) shall be made, except upon the express written approval of the Commissioner of Health; nor shall any additional structure be erected upon the lot without such approval, and a special permit. Printed upon the face of the permit are details of the plan of the plumbing, which will be insisted upon by the Commissioner of Health. This plan provides that all materials used must be of good quality and free from defects, and all work must be executed in a thorough and proper manner. All plumbing must be so placed as to be readily inspected. Every soil and waste-pipe, iron or lead, must extend through and at least four feet above the roof, be of undiminished size, and provided with suitable cap or top. The house drain, if of iron—a material much used for these pipes in America—shall have a fall of at least half an inch to the foot, and be provided with a proper trap near the street, and with an inlet for fresh air inside the trap. It should run along the cellar walls—a favorite plan in America—and never be hidden underground. All iron soil-pipes must be sound, free from holes, of a uniform thickness, of not less than $\frac{1}{8}$ of an inch for a diameter of two, three, or four, inches, or $\frac{5}{32}$ of an inch for a diameter of five or six inches. Before connection they must be thoroughly coated with coal-tar pitch, inside and outside, which must be applied hot. All joints in the soil and waste-pipes must be so calked with lead, or cement made of iron-filings and sal-ammoniac, as to make them impermeable to gases. When the house drains are not of iron they must have twice the above-given internal diameter and half the grade, unless in special cases especially sanctioned. Every sink, drain, water-closet, and tub, or set of tubs, must be separately and properly trapped. When a lead pipe or trap is connected with an iron pipe the joint must be made through a metallic sleeve or ferule, and be calked with lead. All traps must be ventilated by a special pipe entering above the roof. Every "safe" under a basin, bath, or other fixture, must be drained by a special pipe, not directly connected with any waste-pipe, drain or sewer. Every water-closet must be supplied with water from a special cistern, and not direct from the main,—no overflow pipe from the cistern to be directly communicated with any soil or waste-pipe or drain,—no cistern for drinking water to be lined with lead. It is stated that wrought-iron, steam-fitted, glazed pipes are the best for house drains, and their use is recommended. When the work is completed, and before it is covered up and the house occupied, the Health Department must be notified, to enable the authorities to send an inspector, upon whose report the Commissioner will act before its final approval. Equally stringent regulations are enforced in respect to the existing, or old, tenement houses, which are regularly inspected by a staff of trained officials, and it may be said with truth of Chicago that there, if anywhere in the world, the life of a jerry builder, or plumber, or owner, is not a happy one. For this reason, and as a guide to those who are striving for improvement in these matters in England, the above regulations and information can not fail to be of interest. The whole plan of administering the Health Department of Chicago has been admirably conceived, and is being ably administered by Dr. DeWolf, the present Commissioner of Health. I would advise anyone who desires to have a model set of forms and regulations for controlling the health arrangements of a large town, to write to Dr. DeWolf for those in use at Chicago. It is not a little surprising to find that whereas wages are exceedingly high throughout America, salaries, and especially the remuneration of health officers, are unusually small and inadequate.

IMMIGRANTS AND SMALL-POX.

A strong argument for the continuance of the Immigrant-Inspection service is found in the work which has been accomplished by it since its inauguration in June last. A review of the past six months' experience, by Dr. John H. Rauch, Supervising Inspector, presents facts of considerable importance. Small-pox is introduced into this country by immigrants, who have such an inexcusable dread of vaccination that they will resort to almost any measures to avoid it. The difficulty of inducing the authorities abroad, or steamship companies, to compel vaccination of all immigrants is thus apparent, especially since their interest in the unfortunate people ceases when the latter are off their hands. Furthermore, it has been shown that vaccination at sea is very unreliable, mainly because of the lack of interest on the part of those who undertake it. The authorities at the sea-coast can not be expected to observe well their moral duty to see that all departing immigrants are properly protected. On the other hand, inspectors on trains working under the supervision of a western service dare not neglect their full duty, as any subsequent outbreak of small-pox can be traced directly to what may prove to be their negligence, or inefficiency. All of the recent cases of small-pox in this city, with its one hundred thousand immigrants, either permanently or temporarily here, have been either among unprotected residents, or among foreigners who arrived prior to the work of the Inspection service. Dr. Rauch says that with the exception of one immigrant during the month of June in Illinois, and one immigrant family during the month of August in Minnesota, it is not known that a single case of the disease has appeared among this class during the past six months in the entire Northwest. This is the more remarkable when it is considered that the service has been largely experimental in an entirely new field of sanitary effort, and, like all experiments, must have been more or less imperfect. It is not to be supposed, for example, that all the immigrants entering or passing through the District have been encountered by the inspectors, or that their vaccinations have in every case resulted in perfect protection. But, whatever the deficiencies, enough has been done to demonstrate that, by the aid of such a service, perfected, as it would be, by being continuously maintained through the immigration season, and coupled with the general and systematic vaccination and revaccination of our native and naturalized populations, this loathsome disease may soon be put in the way of ultimate extinction in the United States. Another important point noted is the absence of any serious complications or results attending the vaccinations of these thousands of people in transit. Among those coming under observation in this District—aggregating nearly forty thousand vaccinations performed immediately prior to, or during the journey—less than a dozen cases of mild erysipelas were reported.



Cook County Jail and Criminal Court Building.

THE DRAINAGE AND VENTILATION OF A PUBLIC BUILDING.

It is hard to conceive that the sanitary condition of a building could be worse than that of the County Jail and Criminal Court Building in this city. The substance of the report of the grand jury was given in the last issue of The Sanitary News, but the facts in that were few and very mildly put. The illustration given above tells the story better, although this covers only a portion of the defects. The part of the figure at the left represents the jail, and that at the right rooms as designated. The space between is the court. All the sewage of these two parts of the building is conducted directly into large cesspools in the basement, two of which are shown in the illustration. The contents are then discharged into the street sewer. The covers of these cesspools were found to be simply loose boards, and the gases generated within thus to have easy means of escape. The contents are composed entirely of the excrementitious and urinal matter from the cells and offices above, together with the water used for flushing, of course. The soil-pipes discharge into the drain, and thence into the cesspools without intervening traps; there are no traps under the water-closets, which are of the simple hopper pattern. Originally, an alleged means of ventilating the soil-pipes was provided by connecting them through a system of galvanized iron pipes with the shaft D. One of these connecting pipes is shown at B, but the defective joint indicates how utterly worthless it is for the original purpose, supposing that everything else was perfect and in working order. At first, there are said to have been traps at the base of the soil-pipes, but they are not there now. They were taken out, it is further said, because they became clogged occasionally and it required too much work to clean them out. In the same way the traps under all fixtures were removed some years ago, and for the same reason. Said an employé at the jail: "We used to have a boy here with an unusually long and slender arm. When the traps under the sinks got clogged he could reach down and clean them out with his hand. But the boy got another job, and as no one else about the institution could get his hand into the traps, we took them out, so as not to be bothered."

To create an upward current in the foul-air shaft D the steam-coils were used as indicated. But the movement of

the air upward was materially checked by the inflow of cold air through such breaks as that shown at C. At A there had once been a branch from some soil-pipe, but it had fallen off and lay upon the ground. Nearly all of the connecting joints in these pipes were found to be defective. There are two of the foul-air shafts, such as that shown at D, in the jail proper, in which there are thirty-four soil-pipes. These shafts terminate at the floor of the attic and discharge the foul air into long wooden boxes, two or three feet square, which in turn lead to the central shaft F. Each cell has two registers in the wall, as shown, leading into tier flues built into the wall and extending upward and terminating, as the two foul-air shafts do, at the floor of the attic, and under the boxes described. Two of these cell-ventilating shafts are shown, contiguous to the shafts which "ventilate" the soil-pipes. The others are apart, and there is nothing to induce an upward current in them except the natural heat of the building. Boards were found torn off the shaft F, and all sides of the boxes connecting with it were loose and separated, thus making of the entire attic a foul-air chamber.

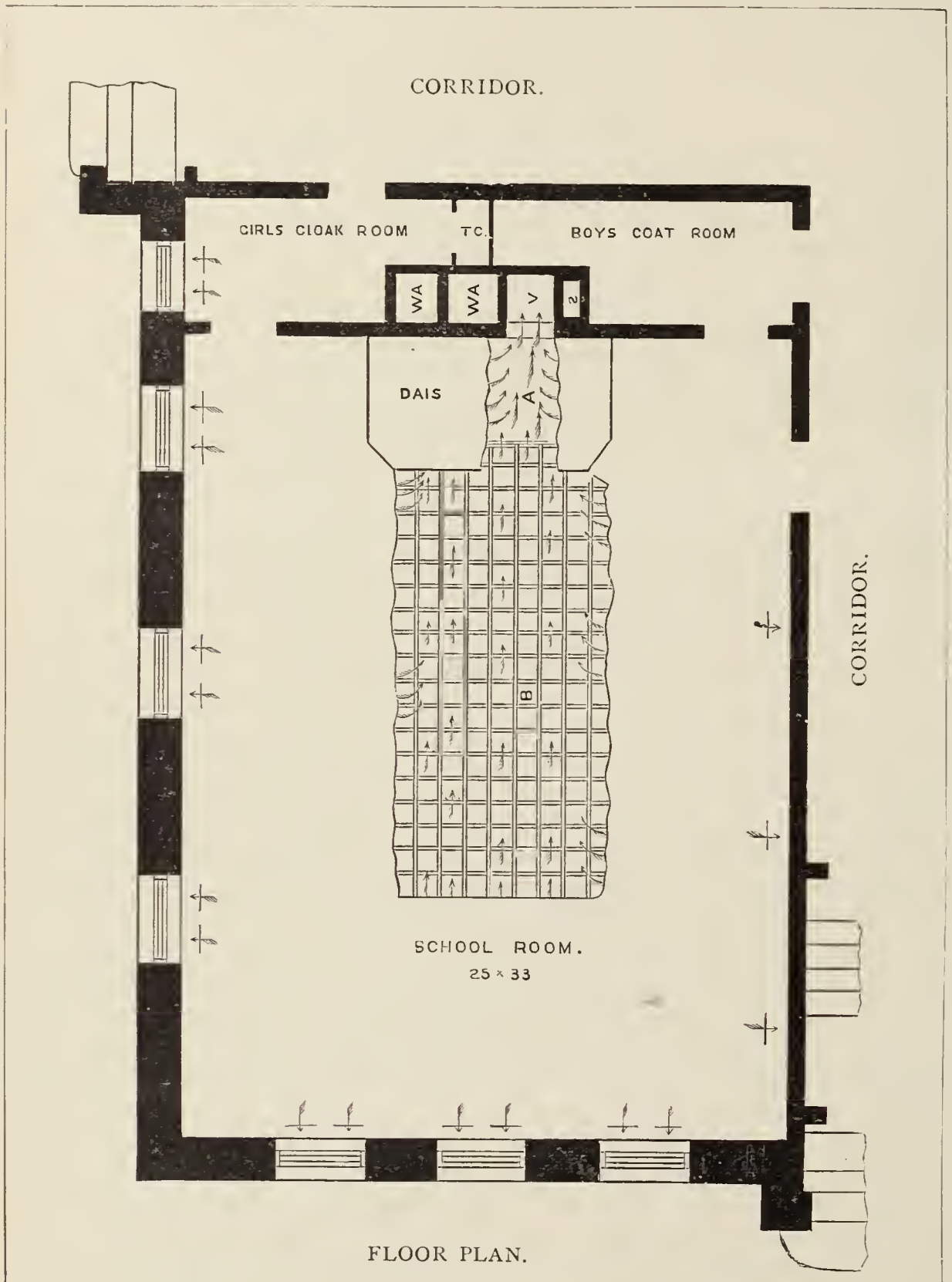
The building is heated by hot air which passes over the coils indicated. The air used for this purpose is obtained from the basement, which in turn is supplied from the cesspools, the soil-pipes and the foul-air shafts. The basement is, mainly, below the grade of the street, and there is no opening into it except through windows, which were found nailed up or so barred that they could not be opened. The bottom of the basement had once been a cemented floor, but it has now become a burrowing place for rats. The "system" of heating and ventilation is apparent. The foul air of the basement, and that drawn from the cesspools and soil-pipes is warmed and sent upward through the registers to be breathed. After serving its breathing purposes it is drawn into the water-closets and down the soil-pipes, or through the cell-flues into foul-air shafts and taken to the attic, whence it is returned, according to the pressure in the various pipes and shafts, by one or more of them to the basement to feed again the hot-air flues. There is a constant movement of air, but indiscriminately through water-closets, soil-pipes, cesspools, hot-air flues, cells and corridors. Actual tests showed that very little of the foul air found its way out of the shafts leading to and above the roof. In short, what was intended as a ventilating apparatus was wholly inoperative, and the cesspools and sewer were being ventilated directly into the jail. To aid this ventilation there were wash-basins, sinks, urinals, etc., on the main floor, whose waste-pipes extended to the drains without traps. From two to three hundred prisoners use the drainage, hence no suggestion as to the abominable stench which pervades the building is necessary. The pipes were found almost literally clogged in some places; in others, they were leaking and the soil is saturated with the sewage.

Originally, it was intended that fresh air should be supplied to the hot-air shafts through a series of underground ducts communicating with one large subterranean shaft, some five or six feet in diameter, which extends to the engine-room in a distant part of the building, at this end of which is a large fan. The large duct is now nearly half full of water, and an exploring expedition was made throughout almost its entire length, on a rude boat constructed for the purpose. This water was evidently seapage from sewage, which had leaked from the drains and cesspools. As a verification of this the engineer said that occasionally the drains became clogged and immediately after this duct would fill with water and "back up" to his engine room and stop his engine. During the progress of a noted criminal trial in the Summer of 1877, the engineer undertook to keep the fan in operation; this was the only time it has ever been used. The stench was so intolerable that he had to go into the "fresh air" duct and clean it out. The dead rats and sewage which he took out "almost killed him" he says; he adds that nothing would ever induce him to undertake a similar job. No provision whatever was ever made for supplying the fan with air; it stands in a room without any exterior opening whatever except a barred and bolted window. The branch "fresh-air" ducts run along in the ground within fourteen inches of the cesspools, both made of a single tier of bricks. The cesspools themselves, it should have been stated, with their loose covers, are almost invariably within five feet of the hot-air shafts, one of which is shown in the illustration, and the open door of which admits the air which feeds it. There are three flush-tanks in the attic, the overflow-pipes of which are simply soil-pipes extended up through them without traps.

As to the rooms in the court-house proper, shown at the right, the illustration indicates the source of supply of "fresh" air for breathing purposes. Further than this, the traps under the wash-basins and the urinals were found to be unreliable. The traps under the urinals were invariably siphoned when the water-closets were discharged, and those under the basins, at least once in five times, in a series of experiments. The "fresh" air for Judge Anthony's private room is drawn almost entirely from a water-closet in the basement, used only by workmen, and without any other means of ventilation than the flue leading to the judge's room. Judge Gardner's private room is warmed by air drawn wholly from an unclean store-room in the basement. The court-rooms are fed by the air and gases drawn from the cesspools. The original flues leading to the underground ducts were found sometimes closed and often open, they having been closed, the engineer said, because inoperative. The first floor of this part of the building is occupied by the Coroner, the Criminal Court Clerk and the States' Attorney. Their rooms are not indicated in the illustration, neither are the main court-rooms on the second floor, and smaller rooms, all of which it must be understood are heated, and have the same system of drainage, as shown. It is to be further borne in mind that no one of these rooms has any means of ventilation, except through windows and doors. The water-closets have not even windows, hence the foul odors which escape directly from the cesspools and sewers, when the traps under the smaller fixtures are unsealed—and this is their condition almost constantly—pass directly into the rooms from which they open.

This building was erected by the county soon after the great fire of 1871. The drainage may have been in proper condition then. The cesspools were not original conceptions of the architect, but were put in when the traps were removed from the base of the soil-pipes, to catch the solid

refuse that found its way into the soil-pipes and would, if not removed, choke the drains. A year ago the drains were cleaned out, but, further than that, they have been left severely alone, except to remove an "objectionable" trap now and then. Recently complaint was made to the Health Department, and a thorough investigation was made by Chief Inspector Genung, which has led to official action by the County Commissioners. Mr. A. W. Murray has made a subsequent examination, and he recommends that if any enlargement of rooms is contemplated in the future, that strict attention be paid to ventilation; that the drains be repaired where necessary, and the catch-basins be placed on the exterior of the building; that an artesian well be sunk in the jail yard to insure an augmented water-supply for flushing the catch-basins and water-closets, for the purpose of keeping them in a proper sanitary condition, and that the water-closets should be trapped and ventilated, and the floors, walls and ceilings of rooms containing water-closets be lined with marble. His report concludes with the recommendation that the court-rooms be supplied with a larger number of pure and foul air ducts, and that the warm-air shafts be supplied with pure air from the outside.



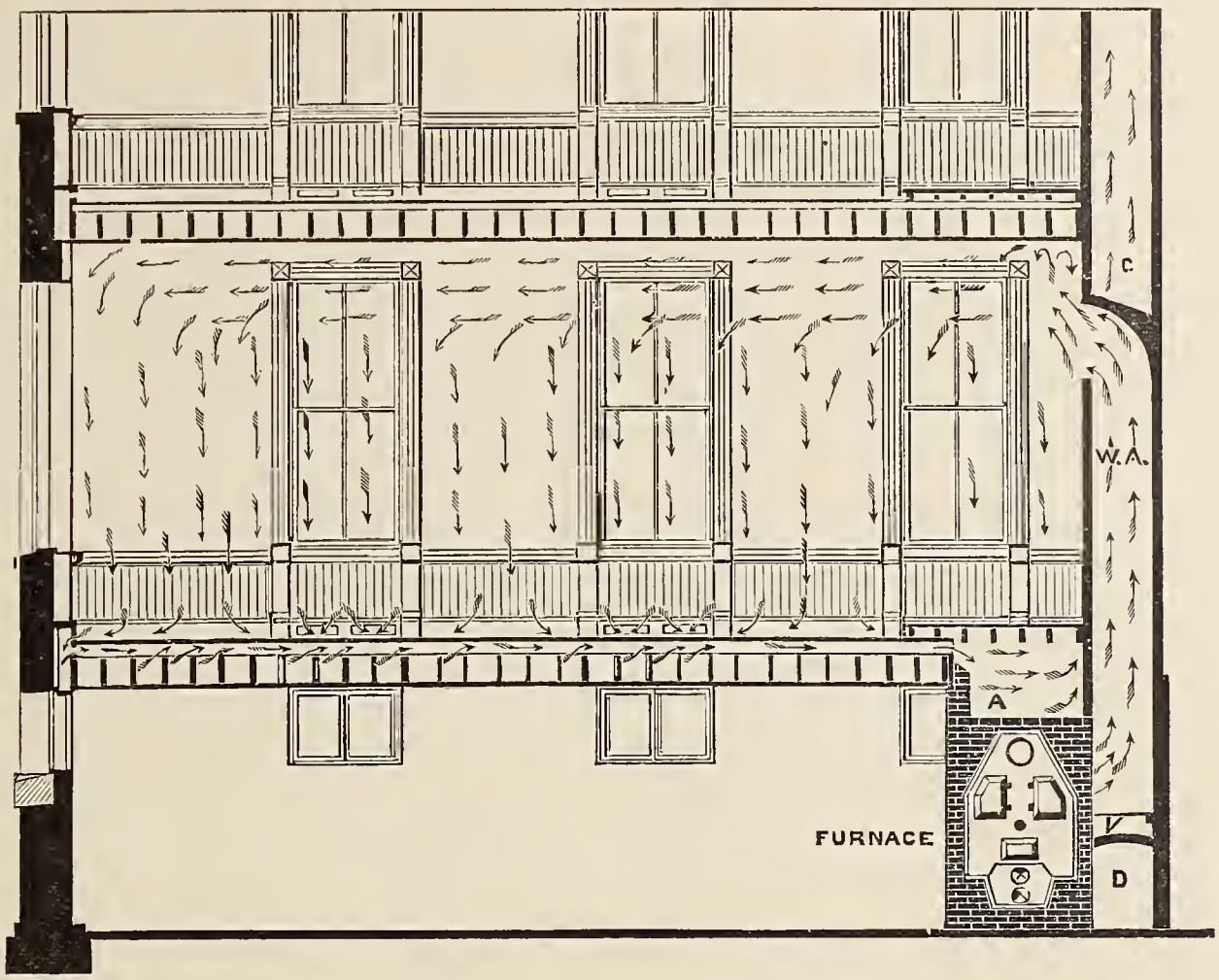
FLOOR PLAN.

FIG. 1.

THE RUTTAN SYSTEM OF VENTILATION.

TO THE EDITOR OF THE SANITARY NEWS: The unusual amount of interest manifested by the general public in everything pertaining to sanitary science has led me to think that an article on the subject of ventilation would not be unacceptable both to yourself and readers; and, to this end, I propose to lay before them a general exposition of what is known as the Ruttan system, which I think is but imperfectly understood. Without further preface I will attempt to explain the principles on which the late Hon. Henry Ruttan, of Coburg, Canada, predicated his system and theories of ventilation.

A leading feature of the principle is that if we introduce a volume of warm air into a room that is at a higher temperature than that already in the room it will, by the laws of gravitation, be immediately lifted to the ceiling and there remain until its temperature is lowered by giving off its heat to surrounding objects, and as it becomes cooled it will settle down and give place to still warmer air; and this process of changing is continually going on, so long as the supply of heat is kept up. It matters but little whether the warm air is introduced through the floor, ceiling or walls that inclose the room at some point between the floor and ceiling—the effect in either case being substantially the same,—the warm air at once rises to the ceiling, spreading itself out in a level zone throughout the upper part of the room. If one will take the trouble to experiment with a thermometer by measuring the temperature in such a room he will be surprised to find how evenly this zone of air is distributed from the ceiling down. If we remove one head of a barrel and stand it upright on the other, and then turn a pipe of water over the top, it will fill the barrel from the bottom upward with a level zone of water; this will continue until the barrel becomes full. This is exactly the Ruttan principle of filling a room with warm air, except that, unlike the filling of the barrel with water, it be-



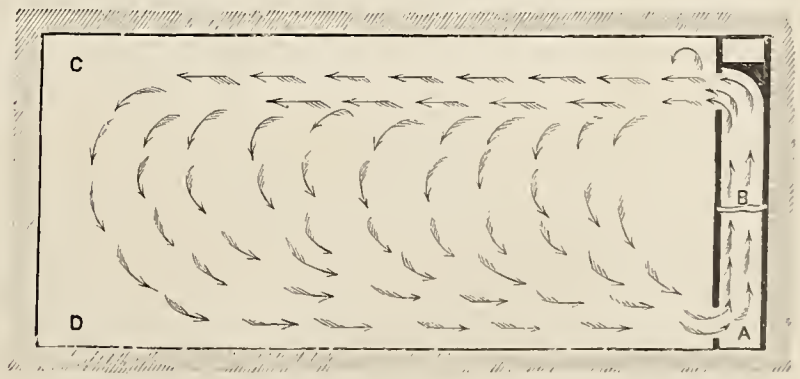
LONGITUDINAL SECTION OF SCHOOL ROOM.

FIG. 2.

gins to fill from the top down. But suppose that in filling the barrel with water we leave the bung out; what then? When the lower half is filled to the bung-hole the water at once runs out as fast as the pipe fills it. So, too, with our typical room; if we leave a door open or a sash down, there will be no further filling with warm air, because it will pass out of the openings as fast as it comes in from the source of supply. It is plain that we cannot fill our barrel with water while the water can escape through an outlet; so, too, we can not fill a room so long as there are openings in the walls through which the air can escape.

Now, I will endeavor further to illustrate our subject by the introduction of a room to be ventilated, and for this purpose will take as a fitting type for the purpose a school-room. Figure 1 represents the floor of a school-house ventilated on the Ruttan principle, the middle portion of the floor covering being removed to expose the timber work and show the directions and movement of the foul air passing from the room. Figure 2 represents a vertical, longitudinal section taken through the middle of the room, and showing by the arrows the direction and movement of the air as it enters through a register in the wall of the warm-air flue, till it passes out of the room through a perforated base prepared for the purpose. Figure 3 is also a diagram showing a section of the room with the air passing into it from a flue near the ceiling, while it passes out through a similar opening just above the floor into a ventilating flue prepared for the purpose.

Referring to Figure 1, we see by the arrows pointing toward the walls and located under the windows that the ventilating base is set mainly at these points as the most suitable place for exhausting the air from the room, and for the reason that at the windows there is the greatest quantity of condensed or cooled air gravitating to the floor, and which, if not taken at once out of the room, would slide along and across the floor under the children's feet and keep them continually cold and uncomfortable. These corners formed by the junction of the floor and outside walls, where all the cooled and condensed air — condensed by contact with the glass in windows and wall surface — accumulates, would be intolerably cold if the air were allowed to aggregate there and pass over the surface of the floor. But the Ruttan system catches it as it falls there and takes it through the base under the floor and to an exhaust shaft and thence out of the building. For this special reason this system is often referred to as the downward-ex-



VERTICAL SECTION OF SCHOOL ROOM.

FIG. 3.

haust system. The warm air comes into the room and passes directly to the ceiling as already explained. Then as the air is exhausted at the floor through this perforated base it gradually settles down from the warmest zone at the ceiling until it reaches the floor, by which time it becomes partially cooled. It will be seen that by this arrangement the warm air is continually drawn toward and to these cold corners, represented by the letter D in Figure 3. Otherwise, if the air is withdrawn from the room above the floor, instead of under it, it comes in as indicated in Figure 3, passes along the ceiling till its force is checked by a counter-current above the floor, where it gradually takes a back course toward the exhaust register, and, where it is most needed—along the base of the room,—no heat can be made to go. Thus, there will always be a cold zone at the floor surface. On the other hand, the constant exhaust at the base is as constantly taking the coldest air out of the room; in other words, the warmer air at its lowest temperature when it is passed under and warms the floor, is gathered to the exhaust-shaft, where the remaining caloric in it is utilized in giving vitality to the movement of air in this shaft upward and out of the building. In this way we have what may properly be termed the lungs of the building. The pure fresh air from without is taken in at some point, generally at several points, and is passed through the heaters. These may be hot-air furnaces, or, in their place, a coil of steam or hot-water, pipes, through which the fresh air should be passed in large volumes to the warm-air flues and thence to the school-room; when it has done its work there, it will pass out through the base and under the floor to the exhaust-shafts.

There is a multitude of details connected with this system which must be thoroughly understood by the architect, or ventilating engineer, before he can hope to make a success of such an undertaking, and the failure of ninety and nine of the persons who undertake to do it, to every one who makes a success of it, is no argument against the system, nor the principle that underlies it. It can hardly be said that Mr. Ruttan was the author of the principle, because it is and was a God-given inheritance, but it still remained for Mr. Ruttan and others to discover the way to do it. It is not a system which can be copied, but the man who undertakes to do it must first master the general science of ventilation, and then it will be the easiest thing imaginable to apply it to any building under any circumstances, with an assurance of complete success. I know of no other ventilation that can be said to rise to the dignity of a system, except that known as the upward-exhaust, so named in contradistinction to this, which, as I have said before, is sometimes called the downward-exhaust system. The upward-exhaust is far less complicated in its details and may be used in buildings to which it is applicable with less danger of failure, because its principle is that of natural ventilation, while the Ruttan system is not strictly so. There is in the two systems this difference, that natural ventilation is that wherein the heated and consequently lighter and rarified air, by the fact of its being lighter, rises and passes off from a room by any opening that will allow it to escape, while in the Ruttan system this lighter air is stopped in its escape from the room, turned back and made to do service in another way before going out of the room. The old-fashioned fire-place was a specimen of the early Ruttan ventilation, but it lacked the vital principle of passing the air under the floor when it left the room; and I am surprised to see how many architects there are in the land who have not gained anything in this kind of sanitary knowledge in the last forty or fifty years. The cut, Figure 3, with its outlet register instead of the fire-place of fifty years ago, or the fire-grate of to-day, fitly represents a large share of the work done at the present time by architects, from the Land of Steady Habits to the Pacific Slope, as their best works will show. (See *The Sanitary Engineer* of last year.)

But it is not altogether in the school-room that the superiority of the Ruttan system of ventilation asserts itself. I will name another place where it will be appreciated by all. I will suppose we have a room, or rooms, in our dwellings with a warm-air register for furnace or steam heat in the floor, usually in the warmest part of the room, and in the outside walls windows of the ordinary kind, or, better still, bay windows. These are usually cold places, and often so cold that no one can sit in or stay near them. Now, see how nicely the Ruttan ventilation will apply to such a place. We will suppose the warm air to be coming into the room through a register in a part of the floor generally furthest removed from the cold sides or outside walls, and that we want to make our bay-window warm and comfortable. How shall we apply the Ruttan ventilation to make it subservient in accomplishing our purpose? Substantially as we would apply it in ventilating and heating a school-room. We would take the air out of the room at the places we might suppose would be the coldest, say through a register in the bay-window floor, or in the floor under other windows. If the floor is not furred say above the joists, as for a school-room. I would connect the register beneath the floor, by a wooden, or tin, air-duct, with a ventilating flue, and in this way get a current of air passing out of the room at this point to the ventilating shaft. If to warm this part of the room is the chief object to be gained, this air-exhaust may be connected directly with the cold-air chamber of the furnace, or a heating coil if steam be used, in which case the air in the room would be passed round and round through the heater and thereby a great amount of fuel saved.

In conclusion, let me warn the reader that ventilation is always at the expense of heat. If you want to heat a building only you need only about half of the heat required if you propose to ventilate also; and in laying out your building plans, make your hot-air and ventilating flues sufficiently ample to carry a large volume of moderately-warmed air, and make ample provision for exit from the building of the foul or vitiated air. Of course, these flues must be proportional to the work they are expected to do. Make your heating apparatus ample, and remember that if you have a given amount of heating to do your apparatus will perform its work in a great deal more satisfactory manner when it is ample for the task, and last much longer than if over-worked. I want to say to school-boards, church trustees and individuals who have to contract for the heating and ventilating of buildings that it makes no difference in regard to the working of a ventilating apparatus whether the building is heated with steam or furnace heat, provided it has an ample amount of it; and to warn them against the suppo-

sition that their building is well ventilated because it is sufficiently warmed. If you contract with a heating engineer to heat and ventilate your building and stipulate that it shall be heated to a temperature of 65 or 70 degrees Fahrenheit, he can do it with a great deal less than a proper amount of heating apparatus by sending to your rooms a small quantity of air intensely hot, which will mix with the air already in the room and impart its caloric to this air until the whole will be at a sufficiently high temperature, and with but little change of the air in the room. This kind of sharp practice may answer the letter of the law, as where heating is the thing expressed in the contract, but if you would ventilate as well as heat, it is important that your warm-air flues be very large, and that the amount of heat you want should be transported to the room to be heated in a large volume of air. School-boards should never attempt to judge of the sufficiency of such heating apparatus when an expert can be found who is better qualified to judge of its efficiency.

In another and future communication I may go more fully into the details of construction of buildings, in preparing them for ventilation by the Ruttan system, or even the other or upward system, than your space will admit of here.

G. P. RANDALL.
Architect.

Chicago, December 22, 1882.

THE MASTER PLUMBERS' ASSOCIATION.

At the last meeting of the Master Plumbers' Association, held on the evening of December 21, a paper was read by Mr. Andrew Young, entitled "What shall we do to be Saved?" This afforded him a text for a sharp criticism on some existing sanitary methods. He thought that the resources of this city warranted larger appropriations for the Health and Sewerage Departments, so that they could employ more men as inspectors, and those who had technical knowledge of plumbing and sewerage. He commented upon the discoveries made at a late day in the drainage and ventilation of the County Jail and Criminal Court Building, and regretted that a promised inspection of the new City Hall had been smothered by the Council Committee to whom the matter had been referred. Mr. Young ridiculed the present method of flushing the sewers, giving a rather humorous account of it. He suggested that the flushing might be done with water accumulated in elevated lakes in the parks, supplied by artesian wells; or that artesian wells be sunk for this purpose in the streets not adjacent to the parks. He thought that too little attention was given to the subject of food adulteration, and the contamination of food by foul cellars, or sewer emanations. He instanced a very common source of danger in connecting the ice-chests of meat-markets directly with the sewer through a waste-pipe untrapped. He said it was a common occurrence to run these pipes into the sewer at the point from which the soil pipe of a temporary water-closet had been removed by the previous tenant of the building. Anything to conduct the water out of sight was sufficient, so far as the market proprietor was concerned, but the result was the poisoning of the meat he weighed out to his customers.

The report of a committee on the subject of discriminating between good and bad workmen was read. Incompetent workmen were divided into three classes, those who were addicted to drink, "botches," and those who continually move around from one employer to another. It was recommended that different-colored tickets be issued to the different classes. Excellent workmen should be known by a special badge. With regard to apprentices it was regretted that intelligent boys could not be induced to learn the plumber's trade. The report was accepted and the committee thanked for its services.

The announcement was made that Prof. S. A. McWilliams would soon lecture in some public hall under the auspices of the Association, the time and place to be fixed and announced later by the Sanitary Committee.

HEALTH IN MICHIGAN.

Dr. Henry B. Baker, secretary of the Michigan State Board of Health, reports that during the week ending December 9, intermittent fever, influenza, tonsilitis and pneumonia increased in Michigan, and that neuralgia, diphtheria and typhoid fever considerably decreased, typho-malarial fever, bronchitis, cholera morbus, diarrhœa and whooping-cough also decreasing in area of prevalence. The following week, typho-malarial fever, pneumonia, tonsilitis, bronchitis and whooping-cough increased, and remittent fever considerably decreased. During the previous week the prevailing winds at the State Capital were southwest; the following week, west. During the latter, as compared with the former, the temperature was higher, the absolute and relative humidity and the day and night ozone more. During the week ending December 16, and up to December 21, diphtheria was reported at seventeen places; scarlet fever, at sixteen places, and measles at three places. The last case of small-pox in the State—at Grand Rapids—was discharged from the hospital on December 14.

THE NEW LIBRARY ROOMS AT PULLMAN.

The new library at Pullman is in keeping with the other model appointments of that model town. Five large rooms in the Arcade Building have been set apart for it, and it will be supplied with fifteen thousand volumes, five thousand of which are already at hand; the rooms have a capacity for fifteen thousand volumes. The main room is in the southwest corner of the building, and is 60 x 40 feet in size. The book-cases are made of cherry. To the left of the main room is a men's reading-room, 18 x 19. At the right of the main room is a suite of three rooms, one of which will be used for the librarian's office, another for a ladies' reading room, and the third will probably be used as an art studio. The decorations have been under the supervision of Mr. Hughson Hawley, the scenic artist of the Madison Square Theatre, New York, who has also had charge of the decorations of the Opera-house. The wood-work is made to represent richly-stained mahogany and cherry, with here and there a band of dark olive color. The walls are painted a uniform dark-bronze green. The smaller rooms are papered, bnt the same harmonious coloring has been preserved throughout. The furniture of the library has been selected with an eye to beauty and durability. The floors of the main room, librarian's room, ladies' room and studio are carpeted with rich Wilton. A set of ebonized wicker arm-chairs, with bottoms and backs cushioned in dark-maroon plush, are in the main room. Several carved ebony lounges, also upholstered in rich maroon, are to be found in the main room. The other rooms are similarly furnished; all have fire-places with beautifully decorated wooden mantels. The windows have venetian blinds. The beautiful furnishing of the rooms is due to the attention given to it by Mrs. George M. Pullman.

CURRENT PUBLICATIONS.

THE SANITARIAN.

This journal has been published ten years as a monthly. It now begins a new year and a new volume as a weekly, the increased interest in sanitary matters warranting, it is believed, the change. The size is considerably enlarged and the mechanical appearance improved. There is internal evidence that it will continue to hold high rank as a sanitary journal. It is noteworthy that its publishers recognize the necessity of an attractive appearance, and a successful effort has been made to meet this requirement. Dr. A. N. Bell continues as editor, and Dr. T. P. Corbally as associate editor.

THE MODERN AGE.

The January number is the first issue of the new periodical, *The Modern Age*. It appears in convenient shape, in brown covers and printed in clear type on superior paper. The character of the magazine is principally eclectic, but differs from the older periodicals of its class in having more translations. It "comes into existence," the editor says, "not because the world is in need of more good white paper spoiled, but with the idea of disseminating among readers on this side of the Atlantic — and at a price within the reach of all — selections from the best of such light literature as is current in England and on the continent." The selections in this first number appear to be made with

discrimination, and the editorial comments on current events are creditable. Departments of "Books and Book Men," and the "Stage and Studio," complete the number.

BOOKS RECEIVED.

"Baths and Bathing." Health Primer Series, No. 6. Square, 16 mo, cloth, 40 cents. D. Appleton & Co., 549 and 551 Broadway, New York.

"The House and Its Surroundings." Health Primer Series, No. 3. Square, 16 mo, cloth, 40 cents. D. Appleton & Co., 549 and 551 Broadway, New York.

"Premature Death: Its Promotion or Prevention." Health Primer Series, No. 4. Square, 16 mo, cloth, 40 cents. D. Appleton & Co., 549 and 551 Broadway, New York.

"Gouge on Ventilation." A Book for the Household. Fourth edition, enlarged with new illustrations. By Henry A. Gouge. New York: D. Van Nostrand, 23 Murray and 27 Warren streets.

PERIODICALS RECEIVED.

"The New York Medical Journal." A Weekly Review of Medicine. D. Appleton & Co., New York.

"The Medical Journal and Reporter." A Weekly Journal. D. G. Brinton, M. D. 115 S. Seventh st., Philadelphia.

"The Modern Age." Vol. 1, No. 1. Published monthly at $1,60 a year. The Modern Age Publishing Co., Buffalo, N. Y.

"The Sanitarian." New Series, Vol. 1, No. 1. Published weekly. A. N. Bell, A. M., M. D,, Editor. 113 Fulton st., New York.

PAMPHLETS RECEIVED.

"Heating and Ventilation." A Manual of Practical Information. L. A. Spaulding, Chicago.

"Annual Report of the State Board of Health of Wisconsin," Vols. I to VI. J. T. Reeve, Secretary, Madison.

"Fourth Annual Report of the State Board of Health of Illinois." Compiled by John H. Rauch, Secretary, Springfield.

"Nostrums in their Relation to Public Health." Reprint from the Annual Report of the Michigan State Board of Health for the year 1881. Albert B. Prescott, M. D., F. C. S., Professor of Applied Chemistry in the University of Michigan.

NOTES AND NEWS.

WATER-SUPPLY.

There are in use in this city about 514 miles of water pipe. Nearly 20 miles of pipe were laid in 1882, at a cost of nearly $200,000, including hydrants, stop-cocks, etc. The quantity of water supplied during the year amounted to about 25,000,000,000 gallons, an average of almost 70,000,000 gallons per day. Nearly 6,000 service pipes were attached during the year, about 70 elevators put in, and 225 water-meters. The superstructure of the lake crib has been completed, two new pumping engines on the West side are well under way, and the foundations in course of construction. The cost of these engines, the foundations and buildings will be about $400,000.

The Water Department of this city collected during the year just closed more than $1,000,000, an increase of $100,000 since 1878, this, too, after a reduction in the rates of 25 per cent., and a still further reduction of 10 per cent. to all who pay their rates in May and November. Nearly $300,000 of the water debt has been paid, and two pumping engines are being erected at a cost of a quarter of a million dollars. There is now on hand, to the credit of the Department, about $300,000.

CHICAGO SEWERAGE.

It is shown by the Sewer Department of this city that during the year the following work was accomplished: Sewers cleaned, South division, 251,765 feet; West division, 409,655 feet; North division, 218,329 feet; man-holes cleaned, South division, 1,453 feet; West division, 1,555 feet; North division, 1,019 feet; catch-basins cleaned, South division, 3,994 feet; West division, 4,684 feet; North division, 2,755 feet; raised to grade, 1,178 man-holes and 1,313 catch-basins, where streets were improved during the year; new basins built, South division, 249; West division, 381; North division, 82; total, 712. The total length of the new sewers built was 98,908 feet.

MISCELLANEOUS.

During the past year the tenement and factory inspectors have examined the houses and work-shops of about 130,000 people—about 10,000 houses and 15,000 factories, lumber-yards, work-shops, etc. About 1,800 plans of dwellings have been submitted to the Health Department for acceptance or revision. The enforcement of the smoke ordinance has involved attention to more than 250 suits in court.

It is expected that the cable cars will be running on the Wabash avenue line by January 10, and that the Cottage Grove avenue extension will be ready a few weeks later. It is possible that the cable will be used on Archer avenue before the end of the present year.

The main branches and forks of the Chicago river were dredged during the past year at a cost of $20,000.

BUILDING INTELLIGENCE.

HYDE PARK.

During the past year over $1,000,000 has been expended in the construction of new houses in that part of Hyde Park north of Seventy-fifth street. Of the four districts within that section, Oakland had the largest number of important building transactions. Hyde Park Center the next, Englewood and the State Street district came third, and Grand Crossing fourth. There has been over $300,000 spent in the district for general improvements alone, besides the special assessment improvements. In the section south of Grand Crossing, including Pullman, South Chicago, and Cummings, there have been improvements which represent the expenditure of several million dollars. The special assessments ordered during the fiscal year aggregate nearly $600,000. South of Seventy-fifth street the building has been more active than ever before.

Messrs. Turner and Fowler are building two fine houses on Lake avenue near Forty-seventh street, directly opposite the residence of Mr. Charles Gossage.

Rev. Galusha Anderson, President of the Chicago University, is building a new residence at the corner of Greenwood avenue and Fiftieth street.

Mr. A. C. A. Rosing is building a unique Swiss cottage on Fifty-third street, between Washington and Jefferson avenues, to cost about $8,000.

Mr. Mills has just completed a new house on Greenwood avenue, between 48th and 49th streets, at a cost of $8,000.

CHICAGO.

An unusually large number of buildings were erected during the past year, more than 2,600 permits having been issued for permanent buildings, the total frontage being 70,000 feet, and the cost $1,500,000.

BUILDING PERMITS.

The following is a list of all new buildings in Chicago for which permits have been granted during the past two weeks, giving location, size, cost and name of owner. All buildings are of brick unless otherwise specified:

204 Orchard st., 1-story cottage, 20x30, $1,000; M. Urwenzer.
426 Taylor st., 2-story dwelling, 21x50, $4,000; Mrs. M. O'Connell.
412 Idaho st., 2-story dwelling, 24x52, $3,000; H. Dufour.
165 Adams st., 1-story store, 25x40, $1,000; F. C. Cramer.
71 N. Western ave., 1-story cottage, 20x30, $1,500; John Bramhill.
Lake Park ave., near Thirtieth st., 3 2-story dwellings, 17¼x52, $10,000; F. W. S. Brawley.
182 Rumsey st., 1-story cottage, 20x40, $600; John Englebrecht.
Thirteenth st., near Leavitt, 4 2-story dwellings, 20x38, $8,000; A. T. Ewing.
Twelfth st., near Oakley ave., 2 2-story stores and dwellings, 45x60, $5,000; A. T. Ewing.
3224 Rhodes ave., 3 2-story dwellings, 50x55, $9,000; J. F. Rhodes.
3617 Ellis ave., 2-story dwelling, 42x41, $5,000; C. O. Gleason.
166 Schiller st., 3-story flats, 23x50, $5,000; Mrs. Sophie Wixtsom.
133 Lincoln ave., 2-story dwelling, 22x40, $5,000; F. A. Williams.
28 Samuel st., 2-story dwelling, 21x32, $2,000; C. Stufflel.
Butler st., near Twenty-ninth, 5 1-story cottages, each 20x30, $4,000; Turner & Bond.
40 Clybourne ave., 2-story addition to dwelling, 24x30, $4,000; Joseph Sehwartzendahl.
143 S. Hoyne ave., 3-story flats, 23x72, $7,000; Miss E. S. Merriman.
Laflin and Monroe sts., 2-story dwellings, 21x40, $15,000; Agnes Irons,
115 North ave., 3-story warehouse, 24x56, $3,500; William Hennig.
535 Washington boulevard, 3-story dwelling, 25x70, $14,000; C. W. Earle.
Erie st. and Western ave., 2 2-story dwellings, 60x47, $10,000; O. M. Brady.
977 Twenty-first st., 1-story cottage, 20x50, $1,500; William Schwrim.
Dashiel st. near Twenty-ninth, 2 1-story cottages, each 20x30, $2,000; A. Crane.
605 and 607 Thirty-second st., 2 1-story cottages, 20x42, $3,000; Howard & Crowhurst.
617 N. Clark st., 3-story store and flats, 25x67, $9,000; M. J. Swertek.
201 W. Thirteenth st., 1-story cottage, 20x50, $1,000; A. Pelke.

The Sanitary News.

Vol. I. Chicago, January 15, 1883. No. 6.

CONTENTS.

CURRENT TOPICS:
- The Milwaukee Fire 61
- Partial Protection in Fire-Proof Material 61
- Regulating the Construction of High Buildings 61
- A Test Case under the Smoke Ordinance 61
- Device for Lighting up the Mouth 62
- Plumbers and their Apprentices 62
- Application of the New York Plumbing Law 62
- The County Commissioners and the County Jail 63
- Chicago Sanitary Inspection Service 63
- Overcrowded Tenements 63

A PROPERLY CONSTRUCTED COLLEGE BUILDING 64
FACTS ABOUT THE EFFECTS OF SMOKE 64
COMMON DEFECTS IN HOUSE DRAINAGE 65
POPULAR OPINION AND SANITARY IMPROVEMENT 67
NOSTRUMS AND THE PUBLIC HEALTH 68
THE RESPONSIBILITY OF ARCHITECTS FOR SANITARY DEFECTS 69
ENGLISH WALL DECORATION 69
MORTALITY IN TOWN AND COUNTRY 69
A YEAR AMONG THE TENEMENT HOUSES 69
HYDROGEN PEROXIDE AS AN ANTISEPTIC 69
CHICAGO BUILDING IN 1882 70
IMPROVEMENT OF CHICAGO STREETS 70
THE WORK OF THE TENEMENT INSPECTORS 70
MORTALITY IN NEW YORK 70
CURRENT PUBLICATIONS 71
NOTES AND NEWS 71
BUILDING INTELLIGENCE 72

NOTHING more terrible can be conceived than the wholesale destruction of human life in the Newhall House fire at Milwaukee on the morning of the 10th. The lessons taught by such calamities have their effect, though learned slowly, and other large buildings in great cities will, it is to be hoped, be better protected hereafter. Much is said about providing fire-escapes, making buildings fire-proof, etc.; but all appliances for extinguishing fires, and all the patent devices for aiding escape from a burning building, are not equal to that sleepless vigilance which ought to characterize the management of every public building. "Fire-proof" buildings will burn, and fire escapes, like life-preservers at sea, fail at the critical moment, but any fire may be quenched at its beginning. The Grand Pacific Hotel in this city is probably the safest from destruction by fire of any hotel in the country, notwithstanding its whole interior is in the nature of an immense tinder-box. Its entire force of more than one thousand is a carefully trained fire-patrol service. It is regularly kept in practice, and at the sound of an alarm each has his particular work to do in handling hose, turning a valve, emptying a bucket of water, etc. Every room is electrically connected with an office on each floor, in which one or more men are constantly on duty; every hall and every corner has a constant supply of water in pails, and there is sufficient hose to use in case of extremity. The safety of the house lies in the means at hand for checking fire at the outset. Fire escapes have often proved useless because they could not be reached. They should be connected by balconies running around the building above the second story.

IF left alone fire will destroy anything. But fire is as necessary as air, and as harmless, too, if kept under control. Fire escapes do not answer the purpose successfully of delivering people from high and ill-constructed buildings, as men and women both lose their wits under trying circumstances, and are easily asphyxiated in their rooms by smoke and the gases of combustion. In addition, then, to that precaution which may prevent many fires, the material of buildings may be made at least partially proof against fire, without constructing them wholly of iron and stone. A torch applied to the scenery in many of the theatres of this city will not burn them at first, as they are coated with non-combustible paint. A material which is intended to take the place of iron beams, composed of coal ashes and plaster of paris, stood a test in New York recently, which iron itself would not. If such material were used in a building, no fire could do serious damage until it could be discovered and extinguished.

THE tendency to construct high buildings without, at the same time, making them proof against fire, has called out a protest from the Chicago Board of Underwriters. A petition has been presented to the City Council asking that an ordinance be passed prohibiting the future erection of buildings to a height exceeding eighty-five feet, unless in all parts constructed of absolutely fire-proof materials, and even then to be used only as offices, where females and helpless children can not be imperiled, and with such proper fire-escapes as shall afford a means of exit to whomsoever they may be rented. If high buildings are a necessity in a city like Chicago, they are also desirable for sanitary reasons. It is undoubtedly true that the upper stories of any building, other things being equal, are more healthy than those near the ground. The air is purer and the sunlight helps to invigorate. To occupy an office, or a tenement, near the ground in the business part of a large city is like living in a cave.

THE smoke ordinance of this city was put to the test again a few days ago in the Criminal Court. Warren Springer, a manufacturer of machinery on South Canal street, had been fined $5 by a justice of the peace, for violating the ordinance. It was claimed by the Health Officers that the lesson was not effective, as dense smoke continued to belch forth from the tops of his smokestacks, and he was again arrested. The defendant's attorney, on the second trial, argued that the ordinance was illegal as it violated the Constitutional provision of equal rights and privileges to all citizens by excepting private houses and

declaring that smoke from their chimneys could not be called a violation of the ordinance. In his decision Judge Tuley said that the necessity for the ordinance was plain enough, and he believed that the ordinance was intended to cover cases of continued or unnecessary emissions of smoke from the chimneys. He had serious doubts as to the legality of the ordinance, but did not think it was palpably a violation of the charter power. He thought the case ought to go to the Appellate Court, and he therefore imposed a fine of $50. Mr. Springer was unwilling to bear the expense of an appeal, and the fine was reduced to $10 and paid. This is the second case which has been disposed of in the higher courts.

SOMETHING has been said recently about a new application of electricity in dental surgery. A small electric lamp is inserted in the mouth and lights up the caverns of decayed teeth. In this connection it may stated that a reflector for illuminating the mouth, which answers the same purpose and much more simply and satisfactorily, has been devised. It consists simply of a glass bulb, or globe, fixed to a standard, and which is filled with distilled water and a solution of sulphate of copper. Behind the globe is an adjustable reflector, between which and the globe is a gas jet. The simple adjustment of the reflector behind the gas jet throws the light in the desired direction. Turned into the mouth and again reflected by the dentist's small glass, the very strong rays of light reveal the minutest defects. Its convenience, as compared with that of an electrical apparatus thrust into the mouth, to say nothing of the absence of annoyance to the patient, can be appreciated. The reflector spoken of is manufactured in London, and two only are said to be in use in this country, one of which is in the office of a Chicago dentist.

THERE is quite as much need that plumbers should have a technical knowledge of their trade as that physicians should be prepared for their professional work, before being allowed to engage in it. The law has something to say in reference to the latter; it ought, also, with reference to the former. A physician can not write a prescription, nor amputate a limb, unless he is authorized by some institution which has, under the laws of the State, taught him how to do it; or unless he shows by an examination that he has properly prepared himself under the tutelage of a competent preceptor. In the absence of schools for plumbers, they should, undoubtedly, be required to serve an apprenticeship before being allowed to do work on their own responsibility. This is a matter of more importance than it might seem to be at first, and it demands the attention of a long-suffering and defrauded public. The remarkable willingness of householders and house-occupiers to permit a man or boy, who can carry a piece of lead pipe in one hand and putty in the other, to do a job of plumbing in a new house, or repair broken pipes in an old one, is no more reasonable than to permit a professionally-uneducated "doctor" to prescribe and administer medicine. Improper medical treatment is no more likely to intensify disease than bad plumbing to be the means of causing it. Again, the strange willingness on the part of the public to accept any applicant for its plumber, is keeping bright and educated young men largely out of the trade. They can not afford to take their chances in a competitive life work in which intellect is not appreciated. As it is now, boys who have helped at the business for six months, or a year, commence to roam about, offering their services as experienced plumbers, and not-over scrupulous employers hire them and send them out to do work for which they are wholly unfitted. This matter was discussed at the last meeting of the Master Plumbers' Association of this city, and it was urged that some steps should be taken to secure a law in this State governing this matter of apprenticeship, and it is not improbable that it will be brought before the legislature at its present session. But the matter is one of national importance, and it is suggested that there should be a National Association of Master Plumbers, which could take it in hand. The plumbers owe it to themselves to elevate their trade by some such protective means, notwithstanding the indifference of the people to good plumbing.

THE first lecture before the Chicago Master Plumbers' Association will be delivered by Dr. A. Reeves Jackson, president of the College of Physicians and Surgeons. The lecture will be given on the evening of January 18, at Fairbank, or Music, Hall, and will be open to the public.

THE first case under the new plumbing law of New York came up in the Court of Special Sessions, a few days ago. The defendant was John F. Crotty, of No. 232 East One Hundred and Twenty-First street. The attorney who appeared in behalf of the Board of Health to urge the prosecution of Crotty, stated that Crotty accepted the contract to do the plumbing for five houses at Alexander avenue and One Hundred and Thirty-Fifth street. The specifications approved by the Board of Health embraced basins properly trapped, house drains trapped at the sewer, and all traps ventilated by a pipe extending from the heel of this trap to the ventilating pipe running to and through the roof. Crotty, however, ran a pipe a short distance above the heel of one trap, and then terminated it, leaving the mouth open. He ran a branch waste-pipe into the room. The end of one of the large soil-pipes was left open in the cellar, the opening being concealed by a beam. There were also many other serious defects in the plumbing of the houses. The connections had been made with iron ferules instead of brass or copper. In one case Crotty had sawed off pieces of lead pipe and used these sections as ferules. Some of the joints were left open, the pipes being merely telescoped into each other. At some of the joints putty was used, and at others putty and lead. There was not a properly arranged and set-up trap or connection in the whole five houses. Crotty acknowledged that he had violated the law, but urged that it had been at the instigation of the owner, who had provided the material, and ordered him to proceed with the work just as he had done. He said that he had worked with all his might to rectify his bad work, and put the entire plumbing in the houses in first class order. He declared that he would not violate the law again knowingly or wilfully. Justice Bixby said that Crotty was guilty of an act that secretly threatened the health and lives of any persons who might occupy those houses. He had made up his mind to send Crotty to the penitentiary and inflict the full penalty

of the law in case of his conviction; but the Sanitary Inspector had supported Crotty's statement that he was doing all in his power to remedy the evil, and therefore he should impose a fine of fifty dollars. This leniency would not be shown to Crotty again if he engaged in any more "skin" work, and no other plumber need be encouraged to attempt deceit in the hope of avoiding severe punishment. Crotty paid his fine and was discharged from custody. An equally effective exposition of the methods of the Crottys in every city would be a public benefit.

THE head of a Cook County Commissioner must be made of cast-iron, and his senses as dull as those of a stone. It takes hammering to get any thing demanding intelligent consideration into his brain. The present Board have utterly ignored the report of the expert who made the examination of the County Jail and Criminal Court Building, and the inmates continue to breathe the poisonous exhalations of sewer and cesspool. The hammering is again renewed, however, by Judge Tuley, now sitting in the Criminal Court. In his charge to the January Grand Jury, he read the report of the November Grand Jury, which concluded with the statement that the lives of all persons who were compelled to spend a portion of their time in the Jail or Criminal Court rooms were endangered by reason of the bad ventilation and drainage of both buildings. The Judge continued: "If this is true — and I see no reason to doubt it — it merits at the hands of the County Board something more than resolutions and appointment of committees. It requires prompt and effectual action. None has been taken. So far as my knowledge and understanding of the condition of the jail and criminal court rooms goes, that report of the grand jury is drawing it very mild. There is at your feet, gentlemen of the grand jury, a register [pointing to a grated opening in the floor, out of which a current of hot, redolent air was forcing its way up into the court-room], that no man can stand over for thirty minutes, unless his stomach is iron-coated. Personally I feel the effects of the foul air in this room very much. There is scarcely a day that I do not retire from this bench with a headache, and unless a remedy is soon provided I may feel compelled to adjourn for the term. If you carefully and fully examine into this matter, and find the report of the November grand jury sustained, it will be your duty so to report, and if possible suggest a remedy. If after having begun your labors you should come to me and ask me to discharge you on account of the unhealthy condition of the jury-room, I shall feel compelled to discharge you."

A BRIEF summary of the annual report of the Tenement House and Factory Inspection Service of this city, given in another column, indicates an extraordinary amount of work during the year just passed, on the part of the half dozen men comprising the force. It is not to be expected that they have caused all sanitary defects in the buildings visited to be remedied, nor that they have materially lessened the overcrowding; but it is true that an almost immeasurable amount of good has been done the poor people with whom they came in contact. It is a pity that the work can not be conducted on a larger scale — more money and men being placed at the disposal of the Department, and better offices and appliances. The material has been collected already, by the indefatigable head of this branch of the Health Department, for most valuable records; and in spite of the present inconvenience in keeping memoranda on imperfect blanks, information about the sanitary condition of every building in the city visited is readily obtainable. But records of such a nature can not long be kept in such a shape. The importance to a man searching for a habitable house of a record which will show the exact condition of the premises he may desire to rent, and the character of the improvements made, is apparent. The two dingy, unventilated rooms occupied as an office, like all the present offices of the city government, are unfit for occupancy. The public has become so aroused to the necessity of sanitary regulations about their premises that the time of the present force is often entirely taken up with attention to complaints sent to the Health Department. Under such circumstances the greedy clothing-manufacturer and cigar-maker crowd more women and children into their workshops, forget to open the windows to admit fresh air, compel them to eat their lunches in filthy basements, and never mend broken drains. It has been shown that, if watched by the city authorities, landlords will keep the houses of their tenants in better condition, and that manufacturers and merchants will have more mercy on their employés. Six men can not attend to this work properly.

AN inexperienced traveler in British Guiana followed the custom in tropical countries in taking a refreshing draught from the stem of one of the many water-holding plants which thrive in the forests, and followed his own custom of taking a "nip" of rum immediately afterward. The man died in a short time in excruciating agony. A post-mortem examination showed that his internal organs were literally sealed up with India-rubber. He had imbibed the sap of the Mimusops balata, the juice of which coagulates and hardens in alcohol. The rum had had its usual effect in the poor man's stomach with necessarily fatal results.

IN the Fourteenth ward of this city there are about twelve hundred tenements, each of which is the "home" for three to twelve families. There are said to be at least one hundred houses in which there is a family to each room. In the Sixth ward there are 797 tenements with an average of sixteen persons to each house. Overcrowding finds its climax in so-called "Cheyenne" — South Clark street, in the vicinity of Polk and Twelfth streets — where an Inspector found sixteen persons living in a single room. All of these people were adults except one. In the Seventh ward there are 602 tenements with an average of sixteen and one-fourth persons to each house. The average falls to thirteen and a half in the adjoining, Eighth, ward, in which there are 363 tenements. The fewest tenement-houses are found in the Third ward, but there is not a ward in the city in which overcrowding, considering the inconvenience and unhealthy character of the premises, has not become a very serious question. If the city were not favored with an unusually salubrious climate and surroundings and pure water, epidemics would make frequent and terrible devastations among poor people.

A PROPERLY CONSTRUCTED COLLEGE BUILDING.

The building of the new College of Physicians and Surgeons in this city, an illustration of which is here given, has architectural and sanitary features somewhat unusual in a college building. The apparent purpose on the part of its founders to construct an edifice which should be attractive in its exterior, convenient, well lighted, properly ventilated and drained, seems to have been reasonably successful. The usual plan for a college building is four walls, roofed over and the interior divided up into a number of boxes, called rooms, in which student and professor spend an hour together three or four times a day, escaping soon enough usually to prevent asphyxiation. Some attention is really paid to sanitary requirements in our public school buildings, but even in these there is much lacking in the way of ventilation and lighting, while drainage is never thought of as meaning any thing more than getting liquid waste out of sight. Colleges, generally, make no pretense in any of these matters.

COLLEGE OF PHYSICIANS AND SURGEONS.

The College of Physicians and Surgeons is located at the corner of Harrison and Honore streets, directly opposite, and in front of, the Cook County Hospital. It was only recently completed. The building is five stories high, 70x 100 feet in size, and the tower reaches 110 feet above the ground. The south and east fronts are of stone; the other walls of brick. A noticeable feature is, it is plain, that the interior is unusually well lighted; there is not a room which has not one or more windows. The building is heated by direct radiation from steam coils. The foul air is drawn off through flues adjacent to chimneys, the coils being so placed that fresh air is warmed before it can circulate through the rooms. The plumbing has been done in accordance with modern ideas, and the underground drains ventilated by a connection with a hot-air shaft surrounding the smoke-stack. The dissecting-room and laboratories are also well ventilated by similar flues, warmed by the always-heated smoke-stack. With the exception of two or three professors' closets, the water closets are in the basement and reached only by an outer door. A well cemented floor prevents the soaking of waste into the earth and consequent pollution of the soil, and cemented walls and ceiling prevent the escape of gases into the upper rooms of the building; but the closets are unusually well ventilated by a heated flue. The professors' closets are ventilated in the same manner. The interior arrangement and the completeness of the building for the purpose for which it was designed are noteworthy. The architect was Mr. G. H. Edbrooke, of this city. Prof. S. A. McWilliams, Vice-President of the institution, and who was chairman of the Building Committee, gave his personal attention to the work from the time the first stone was laid, and thus secured the carrying out of original plans, a difficult thing to accomplish. The institution has been open since the beginning of the college year; and now has an attendance said to be equal to that of older medical colleges in the city. Its curriculum includes a complete course of lectures on State Medicine and Public Hygiene by Dr. R. J. Curtiss, of Joliet.

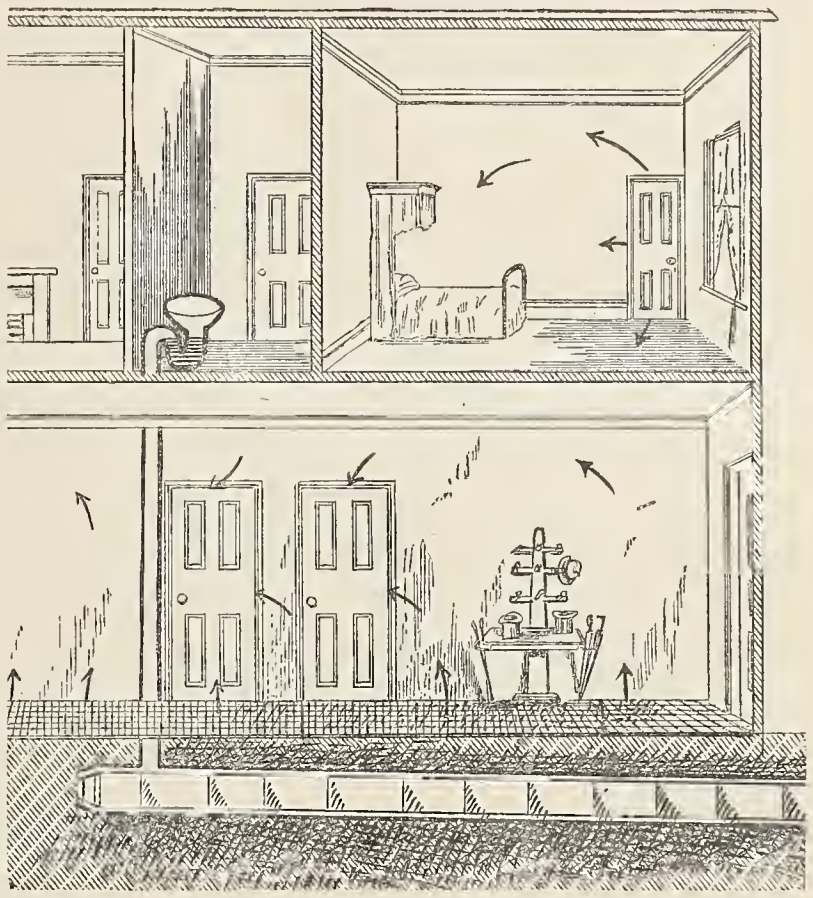
FACTS ABOUT THE EFFECTS OF SMOKE.

The following paragraph, which first appeared in *The Pall Mall Gazette* (London), has been making the rounds of the daily papers in this country: "Some one has at last been found to say a good word for smoke. The Burslem Town Council have been discussing the death-rate in that town, which appears just now to be rather high, and the Medical Officer consoles them by pointing out that the deaths would be more numerous still were it not for the smokiness of the town. The evil effects of their bad system of drainage, he said, are largely counteracted by the smoke from the factories, which blends with the atmosphere to act as a deodorizer; and he was at a loss to imagine how 'intelligent men, and even members of his own profession,' could complain of the 'smoke nuisance.'" It is not at all unlikely that many people might be found who would give the Burslem Medical Officer credit for possessing unusual common sense. The question of a knowledge of chemistry does not enter into consideration in so simple a matter. As the fumes of burning sulphur destroy the germs of disease in an infected bed-chamber, in which a small-pox patient has died, so the gases generated in the combustion of coal, one of the constituents of which is sulphur, must certainly disinfect a poisonous atmosphere. But it should be remembered that disinfection means the absolute destruction of life, whether parasitic or human. To introduce sufficient sulphurous acid gas into the air by the combustion of coal, or by the burning of sulphur itself, to disinfect it, means to saturate it so completely with the new poison that no living thing could breathe it without instant death. The minute organisms which prey upon human beings in the multitudinous developments of disease show quite as much tenacity of life as their betters; indeed, the extinction of the former means the death of the latter, under similar circumstances, but the reverse is not true. To say that smoke acts as a deodorizer means nothing, so far as health is concerned; a deodorizer simply substitutes one

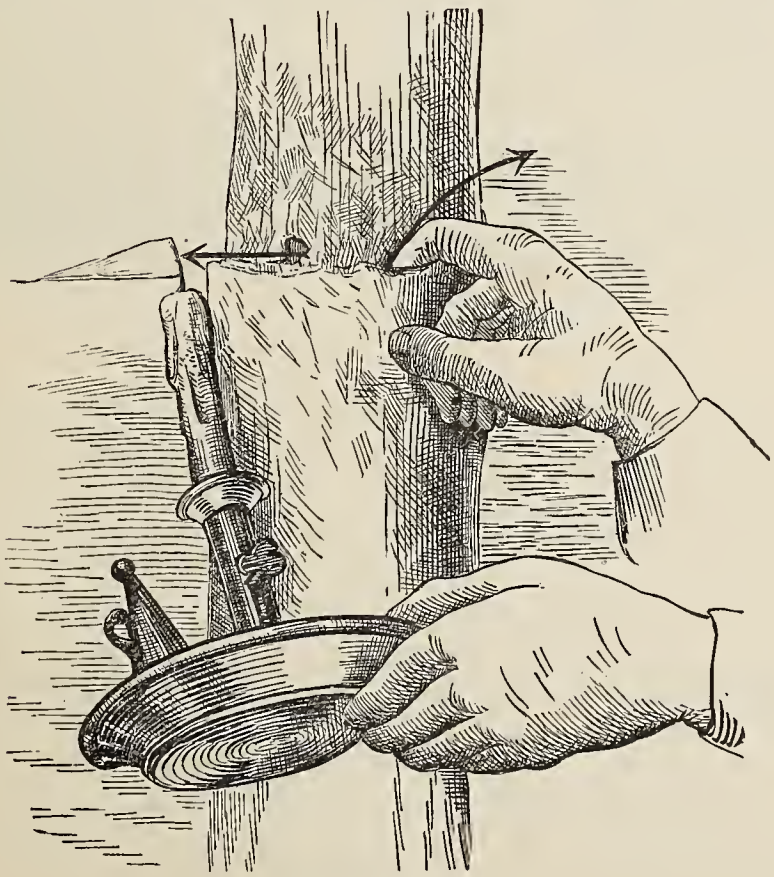
odor for another, and in the case of smoke it is certainly a most offensive substitution. But there is another view to be taken of the matter. The constituents of coal are carbon, hydrogen, oxygen, nitrogen, sulphur and ash. At the commencement of combustion the oxygen of the air unites with the hydrogen of the coal to form water, while the carbon is raised to a white heat, producing light. Part of the carbon is converted into carbonic acid gas, and the remainder passes off in the form of soot. As the carbonic acid gas generated in the front part of the fire-box comes in contact with the red-hot carbon farther along in the furnace, a part of it is converted into carbon monoxide, a poison. These gases with the soot pass into the air, and those who breathe smoke get a greater or less amount of the two gases and the soot into their lungs. The soot is greasy and tends to clog the air-passages. Because greasy it is hard to expel, and does not possess the disinfecting qualities which belong to dry, crystalized carbon. Carbon dioxide, or carbonic acid gas, is not poisonous, but it is asphyxiating, affecting life just as water introduced into the lungs would. As already stated, the carbon monoxide is a direct poison. If the latter on its course through the furnace meets with a second supply of oxygen, or air, in the fire-box, it is again converted into carbonic acid gas, and thus becomes less dangerous. It is on this account that some of the smoke-burning devices of the present day may be possessed of sanitary features worthy consideration, as they introduce a new supply of air to increase combustion. Dense smoke is more than a nuisance, and the more effectually it is prevented the greater the reason for thanks.

COMMON DEFECTS IN HOUSE DRAINAGE.

Mr. Rogers Field, a well-known English sanitarian, discussed the subject of "Certain Less Recognized, but Highly Important, Points in the Drainage and Ventilation of Houses," at a recent meeting of the Society of Medical Officers of Health in London. He first called attention to three sanitary principles which govern house drainage: (1) All refuse matter must be completely and rapidly removed from the house. (2) There must never be any passage of air from the drains, or waste-pipes, into the house. (3) There must be no connection between the drains and the domestic water-supply. Although so simple, he said, these points are frequently neglected. Were the first complied with there would be no leaky drains, no polluted subsoil and no production of foul gases in the drains from decomposing organic matter. Numerous cases are on record where the sewage from houses has apparently run away freely for years, but where the greater portion of it has really been leaking out of the drains into the ground under, or close to, the house. Mr. Rogers said he had found, in one instance, that the sewer had been blocked with shavings which had been left in it when the house was built three years before. In a school-house he had found that the waste from the lavatories had leaked through disused drains under the floor of a large portion of the building, where there was a mass of filth, in some places seven feet deep; no leakage had been suspected. It is not sufficient that, when the drains are exposed, the joints are found apparently well-cemented; the tops of the joints may be good, but the bottoms bad. The only safe test is actually to plug up the drains at the lower end and fill them with water. Very few house-drains stand this test. If the drains are outside the house it is a mistake to suppose that it is unimportant whether they are sound or not; not only may sewage leak out of faulty joints and percolate under the house, but foul air may be drawn into the house. It is important to realize how small an amount of deposit will create mischief by decomposing and generating foul gases; a mere irregularity of the joints, even when the drain has a good fall, may cause this. There is no better test of the condition of the drains than the amount of smell emitted from a ventilated open-



A LEAKING DRAIN.



PUTTY JOINTS.

ing; if drains are properly laid and in thorough working order, no smell, practically, should exist.

After considering the principle that there should never be any passage of air from the drains, or waste-pipes, into the house, the means of isolating the house-drains from the public sewer, the necessity of keeping the drains outside the house, their ventilation, as well as that of the soil-pipes, the position of the water-closets, and the disconnection of the sanitary fittings inside the house from the drains, Mr. Rogers insisted that the danger should be guarded against of trusting too much to those parts of the drainage of a house which are visible, as an index of the condition of other and important parts which are concealed. He referred to a house, the drainage of which had been recently reconstructed, and where all the sanitary arrangements appeared at first sight to be perfect, but where a subsequent examination of the drains which were under the house showed that the joints were in many places defective, and at one point the pipes were not jointed at all, a space being left large enough to insert a hand, although it was stated that special care had been taken to make the drains water-tight. Old drains, which had no outlet connected with gullies, were found beneath the passages and rooms. The house-maid nearly died of typhoid fever; beneath the room she occupied was found an old drain with a large amount of foul deposit. Mr. Rogers also related an instance in which a lady and her cook were attacked with erysipelas and blood poisoning soon after occupying a house. Various alterations in the drainage were made in the absence of the family; but, on their return, the lady was again attacked with erysipelas, other members of the family being attacked soon after. Alterations were again made, and again the lady was attacked with erysipelas, and the house-maid with typhoid fever. Mr. Rogers made an examination of the house and found that an old stoneware drain in the scullery, into which the sink formerly discharged before it was disconnected, had not been removed; although stopped with cement, the work had been imperfectly done, allowing the air of the drain to enter the house.

Mr. Rogers considered the various opportunities which are afforded foul air from faulty drainage inside the house to pass to different parts of the building, windows and fires drawing air though passages, staircases and doors. Foul air might pass along bell-wire tubes. Channels for gas-pipes and hot-water pipes also not uncommonly afford facility for the admission of foul air. The speaker called to mind a particular bed in a school, the occupants of which were constantly subjects of slight attacks of pneumonia, with a tendency to typhoid fever. In this case the foul air was conducted from a lavatory, where there was defective drainage, up a staircase, and, impinging on the ceiling of the dormitory, was reflected on the bed where the sickness occurred. He gave an interesting account of the cause of the Duchess of Connaught's recent illness. Defective drainage was found in the basement of the house, and, after numerous experiments, the means by which the foul air entered the Duchess' bed-room was discovered, These showed that it was only when occupying certain positions in the room that she would be exposed to the influence of the foul air, while in bed she would escape. As a matter of fact, in twenty-four hours after sitting on a sofa in one of these exposed positions, Her Royal Highness' symptoms fully developed themselves.

The speaker concluded by insisting upon a complete disconnection between the drains and the domestic water-supply, the mistakes most commonly made in this matter being pointed out.

G. P. Randall, Architect.

DESIGN FOR CHURCH AT FARGO, DAKOTA.

ADVICE from a Sanitary Engineer in building a house is as valuable as that of the Architect.

THE ILLUSTRATIONS.

The two tasty designs shown on these pages for a church and a school-building are by Mr. G. P. Randall, Architect, of this city. The former was designed for the First Congregational Society at Fargo, Dakota, and the latter for the village of Almont, Michigan. The plans provide for the use of the system of ventilation described by Mr. Randall at length in the last number of THE SANITARY NEWS. Mr. Randall has devoted his attention largely to churches and school-buildings, and many of the best in this city and the Northwest are his designs.

G. P. Randall, Architect.

DESIGN FOR SCHOOL-HOUSE AT ALMONT, MICH.

POPULAR OPINION AND SANITARY IMPROVEMENT.

The Sanitary Engineer publishes a communication from its "special correspondent" at Cincinnati, in which "unscientific opinion as an obstacle in the way of improvement" in Cincinnati sewerage is discussed. The editor comments on the letter as follows:

"We have printed at length on another page a communication from a Cincinnati correspondent, because it is a very good summary of the arguments used by the average alderman and ward politician against sanitary improvements or regulations. The scientific explanation or confutation which our correspondent calls for can not, however, be made short, simple and universally comprehensible as he seems to suppose. Were this possible everybody would be scientific. Science is organized common sense, and in most cases it has to deal with probabilities, not certainties. A really scientific man freely admits almost all the statements made in this letter. Filth does not always produce disease, and when filth diseases are prevalent they do not attack all persons. There is no evidence that scarlet fever, or small-pox, or measles, or whooping-cough are caused by filth. Those who urge sewerage and common cleanliness on the ground that they will prevent these diseases, have either not studied the subject, or take the ground that it is justifiable to frighten people into good behavior by threatening imaginary dangers. This we do not believe. There is abundance of evidence that good sewers in a city diminish disease and mortality, that diphtheria, typhoid fever, diarrhœal diseases, some forms of lung, throat, and skin diseases, etc., are connected with the presence of excreta and decaying organic matter in the air and water, and this evidence is contained in hundreds of volumes in which are recorded the experience of different cities and countries. It is the same kind of evidence which leads a prudent man to insure his house and his stock of goods. The facts that he has never lost anything by fire, that there has never been a fire in his block, etc., etc., do not influence him in the least.

"That pseudo scientists are much more positive and dogmatic in their assertions about the causes of disease and the best means of prevention than the really well-informed scientific man is true. It is also true that it would be a good thing if the public could distinguish between the true expert and the pretender, but this is often impossible. Sooner or later it is true that the sanitary quack, like most other quacks, finds his true level, and that all his declamations, and publications, and reported interviews in newspapers fail to inspire confidence or to keep him in office—but for awhile he flourishes and makes it pay.

"Yet those who really, honestly, wish to know where they can get reliable information with regard to the effects of sewerage, or the merits of different systems of drainage or water supply, will not find it difficult to obtain it. We all know a few, a very few, men whom we consult with a reasonable certainty that they can either answer our questions or tell us who can, and, most important of all, will honestly tell us that they do not know, when such is the case. We believe that the sanitary interests of Cincinnati are just at present in a bad way, and that there is a very considerable danger that it will become an unhealthy city, and suffer serious loss in its business interests. It is in danger from an impure water supply, from defective sewerage, from a large amount of stored filth in privy vaults and cesspools and from its slaughter-houses. None of these things, nor all of them, may produce an epidemic; the probabilities of such a result are, however, at least ten times greater than those of fire on Fourth street, and there are

few business men on that street who do not think it wise to insure.

"It may be said in reply that sanitary precautions do not insure against an epidemic. True, but they go a long way towards doing so, and they certainly promote health, comfort and morality. Cincinnati should have expert advice upon her system of sewers and water supply. She should have a sanitary association, composed of the leading business men and most intelligent citizens of the community, and this association should employ a commission of three of the best engineers in this country to tell them what ought to be done. When they know this, they can then exert their influence to some good purpose. Without this, all effort is wasted, because uncombined and purposeless."

NOSTRUMS AND THE PUBLIC HEALTH.

Dr. A. B. Prescott, Professor of Applied Chemistry in the University of Michigan, has made extended chemical analyses of the various nostrums that are palmed off upon the community as cures for this and that ill. The results are interesting. He has found that of eight so-called "pain-killers," subjected to analysis, six contained the ordinary spirits of camphor, which every thoughtful mother keeps in the house; three contained ammonia, such as any hartshorn bottle would furnish; four were charged with red pepper; all had some alcohol; oil of sassafras was found in four of them, oil of turpentine in two of them, tincture of guaiac in two, chloroform in one, and myrrh in one. One of the most successful contained, in a half-dollar bottle, one-and-a-half fluid ounces of soap liniment, with one-half fluid ounce, each, of capsicum tincture, ammonia water, and alcohol,—in all, four articles of the United States Pharmacopœia. One that was sold at $1.00 for a four-ounce bottle, by a Chinese doctor, who had "studied many years in the Celestial Kingdom," and who visited the towns of Michigan in a gorgeous car drawn by four horses, with a company of musicians and a lecturer, consisted of camphor spirit, lavender compound spirit, ammonia water, sassafras oil, and alcohol. One made and sold in Germany, as "Nature's Own Cure," a sure relief for one hundred and sixty-six different diseases, consisted of red pepper tincture, ammonia, and alcohol. A "Five-minute Fragrant Pain-Curer" that "will quiet every ache within five minutes by an exact time-piece," was a mixture of ether, glycerine, common salt, and water. A "Golden Wonder," or "Seven Seals," was a mixture of ether, chloroform, camphor, peppermint oil, red pepper, and alcohol. Nearly all of these articles were directed to be taken internally, as well as applied externally. A class of nostrums finding considerable sale in Michigan is the line of ague-cures. Of six of these collected and analyzed in that state, five were found to contain the cheaper alkaloids of Peruvian bark,—that is, the medicinal principles accompanying quinine and of similar effect but held in less esteem, so that they are separated from quinine and sold at a much lower price. Red pepper was found in two, aromatic sulphuric acid in two, molasses or syrup in five, and wintergreen oil in one. One consisted of a thin mixture of powdered charcoal, the tincture of chloride of iron, and syrup. These articles were all extended especially to those who had found injury instead of relief from the taking of quinine and other preparations of the bark, and each was published as a new discovery.

The hopeless diseases—those dread afflictions that find no cure in the resources of science and no positive encouragement from the honest physician—furnish a tempting field to the nostrum-vendor. The promissory cures for epilepsy are very numerous. Of those analyzed by Prof. Prescott for some years, the greater number have consisted of various disguised forms of bromide of potassium,—the common remedy for palliation of epilepsy, and one familiar to almost every epileptic and his friends. The last instance that came to hand had a little red bitter bark, common cinchona, in fine powder, mixed with the water solution of the bromide. The sufferer found so much relief from it that he got it analyzed so as to obtain it without paying such an excessive price as was charged for it. In a German report of the analysis of nineteen articles sold to the people for epilepsy, only four, it is said, contained the bromide of potassium; six contained various miscellaneous ingredients, mostly vegetable and of little or no effect of any kind, and nine were wholly trivial and inert. One of the latter was a red-colored spirit of camphor, another was a powder of roasted acorns, another an amulet of certain seeds quilted in cotton to wear about the neck It is noticeable that four of these articles, steadily sold for years under the same name and with the same declarations, had yet undergone an entire change of composition. In one case a powder, which had maintained a steady reputation for relief of epilepsy during seventy years, had been changed in its composition three times, the only constant constituent being the volatile oil of cajeput, by which it was scented. At one time it contained magnesia, during two changes it retained muriate of ammonia, and for a long while contained valerian root.

In certain lines of nostrums, for diseases readily amenable to remedies or palliatives, there are found a considerable number of standard and efficient medicines. Of cures for asthma and catarrh, an analysis of six found belladonna and nitre in two, both to be used as fumigating pastiles; another pastile consisted of nitre and sawdust with aromatics; one used as a snuff contained tobacco and asarabacca; another, a standard one, contained camphor, carbolic acid, golden seal and common salt colored with Prussian blue, while one for inhalation contained carbolic acid, camphor, and wintergreen oil. This last was entitled "carbolate of iodine," and was the only one of the six that made specific mention of any constituent, but the preparation did not contain iodine at all.

THE increasing cost of wood in this country has led to a great number of experiments in preserving from decay all kinds of wooden structures exposed to the weather. Among the more recent plans suggested is one for impregnating wood with asphalt, combined with some kind of antiseptic material. The finished wood, ready to be put together, is first submitted to heat to drive out the moisture, and is then placed in a hot bath composed chiefly of asphalt and carbolic acid. On cooling, the solvent of the asphalt evaporates, leaving a skin or coating of the asphalt on the surface of the wood that resists water and keeps the antiseptic material securely locked within the pores of the wood. The exterior of the wood presents a smooth, black surface that does not need to be painted.

THE RESPONSIBILITY OF ARCHITECTS FOR SANITARY DEFECTS.

I am moved to utter a word of expostulation, if not protest, against the omissions of architects in regard to sanitary requirements. In my daily experience as a sanitary engineer I am constantly impressed with the extent of these omissions, which are noticeable, not only in older buildings, but in those erected within a few months, at any rate since the general agitation of and public interest in sanitary matters. It is not to be expected that the best plumbing and drainage should be found in dwellings erected ten, fifteen, or twenty years ago; yet, many of the worst cases of criminal carelessness and ignorance in plumbing work in my experience have been in buildings barely completed, and which were in charge of architects of the highest reputation and experience. The contrast between the handsome exterior, artistic decoration and rich furnishing of these dwellings and their sanitary defects is so great as to fill one with amazement. I have just completed an examination of a house of this class which occupied several years in its construction, and which is a model of taste and elegance, though the drainage arrangements are wretchedly bad. The underground drains are pitched the wrong way, and, not having any man-holes, have become choked so as to need digging up to clean them. There is not a single ventilated trap in the building; pan water-closets are used; the safe-wastes connect with the soil-pipe and are supplied by weeping-pipes, some of which have become choked and all of which are liable to fail; the tank overflow is connected in the same fashion; the servants' water-closets and slop-sinks are placed in close compartments without any means of ventilation; the pump to supply the tank is of a bad pattern, and hence there is a deficiency of water for flushing fixtures; the hot-water circulation is defective, so that the occupants complain that they cannot take a hot bath when they want to; and, lastly, there is no air-inlet at the front wall, nor traps to the leaders, some of which end close to windows. This is but one of a dozen similar houses, which I have had occasion to overhaul, and it seems time publicly to remonstrate against such neglect and to place the responsibility where it justly belongs,—upon the architects' shoulders. In the case just referred to, in which the plumbing cost some $3,000, the specification reads as follows: "All the plumbing work to be done in first-class manner, with materials of the best kind. It is intended to have a complete and perfect job by this specification, but if anything should have been omitted to make it such it must be done without extra charge." I ask your readers, in view of the details given, whether this specification has been carried out, and who is responsible for the failure to do so? CHAS. F. WINGATE, in *The American Architect.*

MORTALITY IN TOWN AND COUNTRY.

Professor Finkelnburg attempoted to show, in a paper read at the recent Sanitary Congress in Cologne, that cities are not of necessity less healthy than country districts, and that, where they appear to be so, the fact can generally be attributed to local influences affecting the hygienic or economical condition of the population. The analysis and comparison of adult male and female mortality and infant mortality bring out many interesting facts. The male population of the cities is described as being less healthy than the female population, and liable to consumption and affections of the heart, brain and kidneys. In Cologne, the mortality among women over thirty years of age is not less than among men, but is less than the death-rate among women of the same ages in other parts of the Cologne district. Similar results are shown at Bonn. The deaths of men from consumption show a marked predominance in the centers of the textile and metal industries. The fact that a similar result appears in country districts where labor of a similar character is carried on, is presumptive evidence that the mortality is associated with the industrial activity of the towns. Epidemic diseases seem to show an excessive urban mortality only in the case of young children. Infant mortality appears to reach its highest point where the population is most dense, and the proportion of female labor in the factories is most considerable. A more favorable condition, however, seems to prevail in those districts where domestic labor is general. It is proved with a certain amount of clearness that infant mortality varies according to the dwelling accommodation in towns and the amount of parental care which circumstances permit. This result is not a sure guide as to all diseases, for which diarrhœa and similar disorders contribute a notable proportion to urban mortality in general; deaths from diphtheria and whooping-cough in the Rhine provinces are more numerous in the country than in the towns. Professor Finkelnburg also notices that the mortality in cities increases in the summer and fall, while the increase in the country takes place during the winter and spring.—*Popular Science Monthly.*

ENGLISH WALL DECORATION.

There is one thing for which we cannot give the English too much praise, and that is their exquisite wall decorations. In this detail of house furnishing they are still a quarter of a century ahead of us. Some of the tile work is crude, and much of it is too sober in color; but there are public and private buildings in which the tile is employed with most exquisite taste. That there are very many gentlemen's mansions in America, where wall ornamentation is carried to a lofty, even an extravagant, pitch of splendor, I admit; but there is not one public restaurant or music hall or shop handsomely decorated in New York for every twenty in London and the minor English cities. In the theaters in England the decorating is lavish, but not tasteful. In the new Strand theater it is gaudy; and the Royalty, the Royal Comedy, the Novelty, and the other amusement halls are evidences of poor taste. But if one wishes to pay liberally he can have more comfort in any English than in an American theater. The decorations of the Savoy theater are lovely under the cool gleam of the electric light; there is nothing at once so original and pretty as this in Paris. The French seem to care but little for comfort in public places; fresh air is not one of their needs, and they hate innovations—literally hate them. EDWARD KING, in *The Boston Journal.*

A YEAR AMONG THE TENEMENT HOUSES.

According to the report of Chief Genung, of the Bureau of Tenement House and Factory Inspectors of this city, the small force under his charge examined a total of 16,987 buildings during the year 1882. Of these, 9,078 were stores, 6,971 factories, and 938 miscellaneous. The improvements effected were as follows: Defective plumbing repaired, traps and ventilation supplied, 545; defective drainage (sewers, etc.) repaired, 665; new sewer-connections made, 137; new catch-basins built in place of old ones, 7; catch-basins cleaned, 71; water-closets, or privy-vaults repaired or ventilated, 26; privy-vaults cleaned, 591; filthy premises cleaned, 247; new vaults and water-closets constructed, 26; houses lime-washed, 186; leaky roofs repaired, 20; machinery protected, 17; uninhabitable basements cleared of occupants, 22; total, 2,560. The improvements were made in compliance with written notices served upon the owners, agents or occupants, and almost as many more by verbal notices, or suggestions, not placed on record. All the fire-escapes placed on buildings before the appointment of an officer from the Building Department to look after the matter were so placed through action of the Bureau named. The following table shows the whole number of examinations made in each class of work separately, with the number and sex of persons employed in or occupying the premises examined:

	No. of places examined	Occupants and employes	Males	Females	Boys under 15 years	Girls under 15 years
Factories, stores, etc.	16,987	166,676	137,466	29,210	4,143	1,683
Tenement houses	5,755	79,016	40,970	38,046	15,726	16,700
Special examinations	1,425	13,270	6,766	6,504	1,508	1,589
Plans and new buildings examined under State law	765	11,473	5,987	5,486	1,947	1,833
Grand total	24,932	270,435	191,189	79,246	23,324	21,176

HYDROGEN PEROXIDE AS AN ANTISEPTIC.

According to the *Comptes Rendus* Mm. Paul Bert and P. Regnard have studied the action of hydrogen peroxide upon various forms of organic matter and upon fermentations and find that it possesses very remarkable antiseptic properties. All fermentation due to an organized ferment is immediately and definitely arrested by hydrogen peroxide, the

ferment is killed, and even after the removal of the hydrogen peroxide by one of the substances which destroys it most rapidly, the fermentation does not recommence. The yeast of beer is in this manner killed instantly, although it possesses itself the property of decomposing hydrogen peroxide. Specimens of wine, urine and milk, each containing a few drops of hydrogen peroxide, have been exposed for several months in open vessels without exhibiting the least sign of alteration; while other specimens of the same identical liquids, without the addition of hydrogen peroxide, placed beside them, were in a state of complete decomposition. Although organized ferments are destroyed by hydrogen peroxide, soluble ferments do not seem to be affected by it; saliva, diastose, the gastric and pancreatic fluids continue to act in solutions containing hydrogen peroxide. Mm. Bert and Regnard have also studied the action of hydrogen peroxide upon various organic materials, including the albuminoid substances and all the tissues composing the animal body in a healthy or pathological state. The results of their investigations may be summed up as follows: (1) Hydrogen peroxide, even when very dilute, arrests fermentations due to the development of living organisms, and the putrefaction of all substances which do not decompose it. (2) It has no effect upon diastose fermentations. (3) Dilute hydrogen peroxide is not destroyed by fats, starches, soluble ferments, egg albumen, casein, the peptones, creatine, creatinine, or urea. (4) It is rapidly destroyed by nitrogenous collagens, by muscatin, fibrin of the blood, and various nitrogenous vegetable matters. (5) This action is definitely arrested by a temperature above 70 degrees. Putrefaction, however, leaves it entirely intact.

CHICAGO BUILDING IN 1882.

The annual report of the Building Department of this city gives the following as the result of the building operations of the year 1882: Number of buildings erected: South division, 923; West division, 1,596; North division, 594; total, 3,113. Of these 2,128 were dwellings, 306 stores and dwellings combined, 96 stores, 125 factories, and 395 additions; 1,244 were one story high, 1,114 two stories, 550 three stories, 61 four stories, 24 five stories, 9 six stories, 10 seven stories, and 1 nine stories. The total frontage is given as 73,161 feet, of which the West division has 36,916, the North division 15 116, and the South division 22,129. The total cost is $15,824,800, divided as follows: West division, $5,835,700; North division, $3,111,900; South division, $6,-895,200. The actual value of the property is about 20 per cent. greater, as property-owners undervalue the cost of buildings, supposing that taxation is based upon the estimates in the Building Department. The total number of fines imposed for the year for the violation of the Building Ordinance were: West division, 167, amounting to $4,070; South division, 75, amounting to $2,135; North division, 49, amounting to $1,295. House-removing permits were issued as follows: West division, 419; North division, 158; South division, 151. Seven hundred and twenty-eight buildings were removed by permission. The amount expended on the new City Hall was $143,960. The total cost of all buildings for the year was $16,286,760.

IMPROVEMENT OF CHICAGO STREETS.

During the past year more streets have been paved in this city than ever before in one year. The principal pavement has been made of cedar blocks, though granite blocks and macadam are coming largely to be used. Monroe street, between State street and Wabash avenue, has been paved with granite blocks in a manner which must commend itself to future operations. The street was first rolled with a sixteen-ton steam-roller, and then covered with four inches of macadam and again rolled. A layer of two inches of gravel followed, in which the granite rocks were embedded. Dry lake-shore gravel mixed with asphalt cement was packed closely between the blocks. This pavement cost $4 per square yard, and is believed to be imperishable. The asphalt block pavement has been introduced the present year on Wabash avenue. It cost $3.03 per square yard, and the contractor is under obligations to keep it in repair for five years. The sheet asphalt has also been laid on macadam pavement. All the alleys in the business part of the city have been paved with Medina stone on a foundation of gravel, at an expense of $3.50 per square yard. The catch-basins at the intersections of the streets are being gradually changed to the curbstone, on a line with the buildings. The total cost of the improvements on the streets during the year was $1,100,000. The nature of these improvements was as follows: Cedar block pavement, 21.50 miles; macadam, 8 miles; asphalt, 2 miles; Medina and granite block, 2 miles; curbing and grading, 2 miles; total 35.50 miles. There are improved in the entire city now about 183 miles of streets, about 28 per cent. of the entire streets of the city. During the year 1.644 55 miles of streets were swept, an average each month of 235 miles.

THE WORK OF THE TENEMENT INSPECTORS.

The following is a summary of the reports of the tenement inspectors of this city during the past two weeks. When not otherwise specified the buildings are understood to be occupied by one family:

84 Throop st.; 2-story and basement, frame; no traps, drain obstructed, and water under the kitchen floor.

78 Throop st.; 2-story and basement, frame; old and broken wooden drain; no traps; stagnant water under the floor.

76 Throop st.; 2-story and basement, frame; waste-pipes discharge on the ground under the house; no traps; old wooden drain, but broken and not used.

696 and 698 Fulton st.; 2-story, frame; 5 families; waste-pipes untrapped, and enter an open drain,—some of these ending two feet above the drain; privy vaults full and offensive; children sick.

77 and 79 S. Desplaines st.; 3-story and basement, brick; 12 families; drain obstructed and sewage under the floors; plumbing poor.

129 S. Sangamon st.; 2-story and cellar, frame; 4 families; drain obstructed and water in the basement.

207 and 209 W. Indiana st.; 3-story and basement, brick; boarding-house and stores; drain obstructed and stagnant water under basement floor; cement joints defective; water-closets on second floor unventilated and offensive.

125 and 127 Ewing st.; 3-story, brick; 16 families; sinks not separately trapped nor ventilated; sewage under the floor, plumbing generally defective.

143 N. Clark st.; 3-story and basement, brick; hotel; soil-pipe does not connect with the sewer; floor in laundry broken and a hopper used for discharging the waste water serves as a "ventilator" for the grease-basin; defective connection between soil-pipe from water-closet under sidewalk and drain; joints in drain-pipes generally loose; water-closets filthy and building in unsanitary condition throughout.

632 Larrabee st.; 2-story and basement, frame; 3 families; waste-pipes do not connect with the sewer; drains broken; grease-basin and privy-vaults full and offensive.

181½ N. Wells st.; 2-story and basement, brick; 3 families; water-closet not ventilated except into the kitchen through the door and transom.

314 Division st.; 2 story, frame; no traps in the sink waste-pipes.

155 Erie st.; 2-story and basement, brick; no trap in the kitchen-sink waste-pipe; grease-basin full and open.

514 Dearborn ave.; 2-story and basement, brick; no trap in the kitchen-sink waste-pipe; furnace cold air duct obstructed.

106 W. Fourteenth st.; 1-story cottage, frame; 2 families; all the window panes broken, and one window entirely gone; no privy accommodations, no plumbing, no water; place generally dilapidated and unfit for habitation; woman dead in the house, at the time of the inspection, the death said to have been the result of the exposure.

95 Loomis st; 2-story and basement, brick; 2 families; no traps in the waste-pipes; drain obstructed and several inches of sewage under the basement floor; one of the occupants sick.

93 Loomis st.; 2-story and basement, brick; no traps in the kitchen-sink waste-pipes; drain obstructed and sewage under the floor; child died of diphtheria on day of inspection; owner engaged in carting away the sewage under the house.

The deaths in this city during the month of November numbered 811, of which 244 were the result of zymotic diseases. The deaths from small-pox were 14; measles, 3; scarlet fever, 37; diphtheria, 53; croup, 22; typhoid fever, 38, and diarrhœal diseases, 24. The deaths from consumption numbered 65, and from acute lung diseases, 100. Of those who died 347 were under 5 years of age. The annual death-rate was 17.36.

CURRENT PUBLICATIONS.

THE HOUSE AND ITS SURROUNDINGS.

This is the title of one of the series of Health Primers published by D. Appleton & Co., of New York, and is a valuable little hand-book. It is written by an Englishman, and consequently contains some things that could not be put in practice in this country. The book treats of "Soil, Situation and Construction," "Drainage," "Water-supply," "Ventilation," "Closets, Urinals, Slop-water, Dust-Bins, Scullery and Sinks," "Warming and Lighting, Paint and Paper," "Bed-rooms, Nursery, Laundry, Kitchen and Larder," "Disinfectants, Antiseptics, Infectious and Contagious Diseases" in the order named. In discussing the situation of a house the author recommends that unfinished suburbs be avoided, "because the lighting. paving, drainage and other matters are usually incomplete, and often dangerous." The wisdom of the suggestion is illustrated in the ill-health which is found so prevalent in some of the new suburbs about Chicago. Many people have been driven out of the city during the past year by high rents and overcrowding and building in the suburbs to supply them with houses has progressed with great rapidity. The new soil has been thrown up, both for cellar excava ions and to improve the streets, and the result has been a great deal of sickness, principally of a malarial nature. The author discusses the necessity of house ventilation, but is "all at sea" about the means for securing it. To recommend ventilation through open windows is to advise people to endanger their health by cold currents, even supposing that they can get an inflow of air whenever they want it, as they certainly can not. On the whole the book is valuable, as it contains many suggestions of a practical nature. People know so little about building that they had better commence with a "primer" in posting themselves, before undertaking to build a house.

THE POPULAR SCIENCE MONTHLY.

The January Number of this magazine opens with an illustrated article on the great comet of 1882, by Prof. Charles A. Young. Following this are interesting articles on "Scientific Philanthropy," by Alfred Fouillée; "Traces of a Pre-Indian People," by Dr. C. C. Abbott; Herbert Spencer's address under the title of "The Gospel of Recreation;" the second part of Prof. W. K. Brooks' "Speculative Zoology;" a sketch of Prof. Henry Draper, with portrait and other general articles, besides the "Editor's Table," "Popular Miscellany," etc. This magazine keeps good its claim to being the "most successful scientific periodical in the world." It appeals to no one class, but is patronized by intelligent readers of every class all over the country.

THE BUILDER.

What promises to be a most useful "journal for those who build," has come into existence at Holyoke, Mass., with Mr. E. C. Gardner as editor. The publication will appear monthly and will endeavor to "interest all who have to do with building—theoretically or practically." Mr. Gardner has gained a reputation as the author of several useful works relating to house-building and furnishing, and has the credit of being a graceful and accomplished writer in his specialty. The first number is strong in its contents, but rather "slimsy" in paper used, though the typography and illustrations are good. If the illustrations are to be made a feature the paper will be valuable on that account.

BOOKS RECEIVED.

"House Drainage and Sanitary Plumbing," by Wm. Paul Gerhard, Civil and Sanitary Engineer; Member American Public Health Association. New York: D. Van Nostrand, 23 Murray and 27 Warren street. Price, 50 cents.

PERIODICALS RECEIVED.

"The Builder." A journal for those who build. Vol. 1, No. 1. Published monthly at Holyoke, Mass., by Clark W. Bryan & Co. E. C. Gardner, Editor. Subscription price, $2.00 a year.

"Van Nostrand's Engineering Magazine." January, 1883. New York: D. Van Nostrand, 23 Murray and 27 Warren street. Subscription price, $5 00 a year. Single Numbers, 50 cents.

"San Francisco Western Lancet." December, 1882. Editor, W. S. Whitwell, A. M., M. D. San Francisco, Cal. Subscription price, $2.50 a year.

"The Cincinnati Lancet and Clinic." A Weekly Journal of Medicine and Surgery. Cincinnati, Ohio.

"St. Louis Druggist." Published weekly by the Druggist Publishlishing Co., at 618 North Second street, St. Louis.

NOTES AND NEWS.

LIGHTING.

The electricians at the Savoy Theatre have adopted some small Plante secondary batteries, which are arranged in a convenient form for strapping to the back, and which in an improved shape will not weigh more than three pounds. A flexible double wire leads to the lamp, and a couple of brass spring clips readily make the connection when the light is required. By this means a brilliant white light, of about six candle power, can be shown as a star in a fairy's crown, or at the end of her wand, and the danger is *nil*—even the risk of spoiling dresses by spilling acid solutions being avoided in the ingenious construction of the batteries. The fairy adjusts the lamp in her hair, the battery is fastened at her back, the connections are made, and when all is ready a final touch on a switch illuminates the lamp. An amusing incident at the theatre in Brunn occurred recently at the opening night, after the Edison installation had been completed. At the close of one of the scenes a handsome bouquet was presented to the leading lady, and the moment she received it an Edison lamp blazed out in the center, the house receiving it with tremendous applause. In this case the current was conveyed by thin wires direct from the main leads of the machine.

The influence of the electric light on health was lately discussed at a meeting of the Hygienic Society of Hamburg, and Dr. Kruss explained his views on the subject at some length. He referred to the influence of the electric light on the human eyesight, and expressed his opinion that it produces no evil effects, the light having a violet tinge under most circumstances. He referred to the somewhat exaggerated expectations which had been formed as to the distance at which the light was visible at sea; but, on the whole, he considered that the safety of human life at sea had been increased by the use of the electric light in light-houses. The electric light being free from the disadvantages incident to the combustion of gas in the consumption of oxygen and the production of carbonic acid, he considered its development as being a hygienic measure of importance.

Prof. Fleeming Jenkin has patented an electrical system of transporting goods, which he calls "Telpherage." It resembles the wire-rope system, in so far that the vehicles are supported on strained conductors, which suspend the load and at the same time convey the electric energy. There can be no collisions, as if one train gets on to a section occupied by another, it is deprived of motive power and brought to a standstill until the section is clear.

At an agricultural gathering recently held at Lundenburg in Germany, some interesting experiments were made in the use of electricity instead of steam for the threshing of wheat. MM. Piette and Krizik lit up electrically the space reserved for machines, and at the same utilized the current to drive an ordinary threshing machine. The cylinder of this machine attained a speed of fourteen hundred revolutions a minute.

A permit has been granted to the Cook County Electric Light Company to commence work south of Sixteenth street, this city, and its $50,000 bond has been approved.

Electric light-towers are being erected in Fond du Lac, Wisconsin, and the city will soon be lighted by means of electricity.

MISCELLANEOUS.

The question of compensation for the loss of time on the part of the head of a household which has been quarantined on account of some infectious disease, has created considerable discussion of late in England and Scotland. At a recent special meeting of the Glasgow Town Council, the proposal to give workman the compensation spoken of was not listened to. The period during which a family may be kept in guarantine on account of infectious disease, was modified from fourteen to seven days. It was agreed to retain the clause holding medical gentlemen responsible for certification to the sanitary authorities of cases of infectious disease attended by them.

It is a mistake to rise early and take late rest. The rising early is good as a habit of life, if it does not mean robbing nature of her opportunity to recruit the exhausted strength of brain and body by prolonging sleep when that necessary luxury is at length enjoyed. There

would appear to be some need of remonstrance on this score. The fashion of the day favors early rising and the manly "tub"; but those who rise early have, for the most part, set up prodigiously late, and the tub is chiefly appreciated because it rouses the system, and makes it feel —and feelings are very deceptive—strong and vigorous. This is burning the candle at both ends. If we must sit up half the night, it would be better to sleep half the day than to rise betimes and go in for arduous labor after insufficient rest. Early rising is not good, but harmful, without early resting.—*The Lancet.*

There were 932 deaths in Chicago during the month of December. Of these 225 were due to zymotic diseases, 94 to consumption and 116 to acute lung diseases. The deaths from zymotic diseases were as follows: Small-pox, 16; scarlet fever, 29; diphtheria, 56; croup 21; pertussis, 1; typhoid fever, 38; cerebro-spinal fever, 6; malarial fever 4; diarrhœal diseases, 13; other zymotic diseases, 41. As to the ages of the decedents, 373 were under 5 years of age, and 221 under 1 year. The highest death rate was in the Fourteenth ward,—1.96 in 1,000 of population; and the lowest in the Third ward,—.70. Forty-eight per cent. of the deaths in the Fifteenth ward were due to zymotic diseases. The annual death rate for the entire city was 19.95. In December, 1881, there were 1,020 deaths, and in the same month in 1880, 814.

In some investigations made by Dr. W. Roberts, of London, the bacillus of tubercle, or the parasite supposed to be the cause of consumption, was found in the aqueous vapor of the breath of persons well advanced in the disease. This would indicate that consumption is clearly contagious.

The Superintendent of the Sewer Department of the city government of Chicago will ask for an appropriation of $240,000 this year, and recommend the completion of the Twenty-second and Wallace street sewers, and the construction of a sewer on Milwaukee avenue from Indiana street to the river.

The use of opium appears to be on the increase in England. The returns for last year show that duty was paid on no less than 793,146 pounds. Of this quantity 401,883 pounds were re-exported, but that leaves a consumption for the United Kingdom of no less than 391,263 pounds.

Work on the Hyde Park water-works tunnel is progressing at the rate of ten to fourteen feet a day. The tunnel will be six thousand feet in length. Electricity will be used for lighting it as the work progresses.

The prevalence of scarlet fever at Grant, St. Clair county, Michigan, and diptheria at Ridgeway, Macomb county, has necessitated the closing of the public schools at those places.

The loss in this city from fires during the past year was $548,690. The value of property immediately involved was $26,076,980, the insurance on which was $12,541,440.

The December collections of the Water Department of this city, were $101,378, making a total of $1,053,334 for the year, against $936,892 for 1881.

BUILDING INTELLIGENCE.

Architects Bauer & Hill are building a residence for Leo Schmidt at the corner of North State and Goethe streets, this city, to cost $50,000. The architecture is modern renaissance. The basement will be constructed of rock-faced Medina and Connecticut brown stone, the upper stories of St. Louis pressed brick with brown stone trimmings, and the mansard roof of slate with the usual ornaments. The interior will be finished in hard wood. The vestibule at the State street entrance will have polished granite pilasters, tile floor and marble steps. The ground floor will be devoted to the drawing-rooms, library, sitting-room and dining-room. The mansard, or attic, story will be arranged as a large dancing hall.

A building of striking appearance is one of French flats built by L. W. Yaggy at the corner of Dearborn avenue and Erie street. The basement is constructed of Canada red sandstone, the first used in this city, while the upper six stories and attic are of green serpentine rock with trimmings of Connecticut brown stone and terra cotta.

The Trades-unions of this city are erecting a building on the Lake Front at the foot of Madison street. The object of the building is to furnish them a hall for public meetings, small halls for individual union uses, a library, reading room, etc. The structure will be two stories high, and 100 x 212 feet in size. The main hall will seat about fifteen hundred people. The cost of the building will be $25,000. The plans were prepared by mechanics connected with the unions. Pressed brick and cut stone will be used in the construction.

Recently ten cottages were built upon a tract of land in the Northwestern part of this city as a venture. They were almost immediately sold. Ten more will be begun at once and pushed to early completion, and others will follow as rapidly as there shall be a demand for them. The tract comprises 160 acres; it is divided into blocks and is platted for subdivision into lots. The cottages are twenty-five feet in size; they are built on alternate lots, and cost $2,500 each.

The contract for the construction of the Armour Building, just south of the new Chamber of Commerce, has been awarded to Architects Burnham & Root. The plans are not yet definitely decided upon, but the building will be one of the finest for office purposes in the country. It is said that pressed brick will be used instead of cut stone in the outer walls.

A building of flats is in course of erection at the corner of Cass street and Chicago avenue, Chicago, which is the largest on the North side, if not in the city. Above a high basement of Bedford stone are four stories of pressed brick. The structure will cost $90,000.

The old church building in St. Jarlath's Parish, at the corner of Jackson street and Hermitage avenue, is to be replaced by a new one of rock-faced Lemont limestone, to cost $40,000. The architecture will be that of the early English Gothic.

Messrs. Palmer & Spinning, Architects, have drawn plans for a block at the corner of Jefferson and St. Clair streets, Toledo, Ohio, to cost $100,000. The dimensions are 100 x 175 feet, and the height three stories above the basement.

Plans for an apartment house for E. S. Dreyer & Co., at the corner of Clark and Wisconsin streets, Chicago, are being prepared by Architect H. M. Hansen. The cost of the building will be $25,000.

Mr. P. W. Gates, who recently sold the Gault House in this city for $200,000, will erect an elegant residence on Drexel boulevard, between Forty-third and Forty-fourth streets, in the spring.

BUILDING PERMITS.

The following is a list of all new buildings in Chicago for which permits have been granted during the past two weeks, giving location, size, cost and name of owner. All buildings are of brick unless otherwise specified:

116 and 118 Illinois st., 4-story factory, 50x100, $20,000; J. V. Farwell.
143 E. Erie st., 1-story wagon-house, 21x40, $400; J. F. Jerene.
3731 to 3735 Vincennes ave., 3 3-story dwellings, 68x60, $10,000; F. D. Reynolds.
168 Aberdeen st., 2-story dwelling, 25x65, $8,000; E. S. Warren.
405 Taylor st., 2-story dwelling, 24x60, $4,000; John Anderson.
489 Larrabee st., 1-story store, 20x32, $700; C. Shade.
Twenty-ninth st. and Cottage Grove ave., 5 2-story dwellings, each 21x44, $18,000: W. F. Myrick.
3633 and 3635 Dearborn st., 2 2-story dwellings, each 21x50, $8,000; John Lauritzen.
28 Fullerton ave., 1-story cottage, 21x16, $400: H. Freinberg.
Washington and State sts., changed to stores and offices, $25,000; Wm. E. Hale.
96 Vernon Park pl., 2-story dwelling, 24x56, $3,000; Mrs. A. S. Lehman.
324 Jackson st., 3-story dwelling, 22x44, $5,000; Thomas Innes.
123 to 129 Thirty-fifth st., 4 3-story stores and dwellings, $23,000; Mrs. Barbara Titus.
170 Madison st., 2-story addition, 30x180, $10,000; George Harding.
166 Center ave., basement, $600; Thomas McDowell.
746 and 748 W. Jackson st., 6 2-story dwellings, 120x40, $30,000; Ira Brown.
823 Larrabee st., 1-story church, 36x66, $2,500; St. Matthews Reformed Episcopal Church.
604 Holt st., 1-story cottage, 20x46, $1,000; Thes. Molztoff.
22 Cooper st., 2-story dwelling, 21x18, $1,000; Joseph Purcell.
41 S. Water st., 4-story store, 20x140, $12,000; Hau. P. Schilling.
57 E. Pearson st., 3-story dwelling, 26x40, $7,000: Thomas Minchin.
49 Peck court, 4-story dwelling, 18x40, $10,000; Mrs. T. E. H. Hankins.
550 W. Jackson st., 2-story dwelling, 22x62, $10,000; Dr. Norman Bridge.
716 Ohio st., 2-story dwelling, 24x40, $3,000; John J. Shutterly.
3610 and 3612 State st., 2 3-story stores and dwellings, 48x60, $15,000; Toolen & Maloney.
549 Ohio st., 1-story cottage, 20x80, $1,200; Mary Fahy.
188 Rumsey st., 1-story cottage, 18x18, $400; J. Koborlowski.
12 Newberry st., basement, 18x34, $600; Edward Walsh.
3631 Ellis ave., 2-story dwelling, 25x60, $6,000; Mrs. Day.
483 Kinzie st., 1-story cottage, 18x30, $700; Nels Oleson.
20 Rice st., 1-story cottage, 20x18, $700; Mrs. Scanlan.
3845 Johnson pl., 3-story dwelling, 20x60, $3,000; Wm. Pound.
Talmon st., 1-story cottage, 20x10, $1,200; O. M. Wens & Co.
88 Fisk st., 3-story stores and flats, 49x60, $10,000; John Bednorz.
Rear of 561 and 563 S. Clark st., 3-story store and dwelling, 30x40, $6,000; C. E. Robinson.
1222 W. Harrison st., 2-story dwelling, 20x50, $2,500; P. H. Cashman.
356 Ohio st., 3-story dwelling, 26x80, $15,000; J. S. Clark.
557 Larrabee st., 2-story dwelling, 22x53, $5,500; Henry Neuviler.
86 Fourth ave., 5-story store and dwelling, 24x90, $22,000; Andrew Scott.
3100 Archer ave., 1-story store, 20x42, $1,400; E. S. Blood.
2919 Archer ave., 1-story cottage, 22x50, $2,500; E. Horner.
329 Polk st., 3-story store and flats, 23x75, $6,000; M. Mercer.

The Sanitary News.

Vol. I. Chicago, February 1, 1883. No. 7.

CONTENTS.

PLEASING ENCOURAGEMENT 73
CURRENT TOPICS:
- Inspection of Tenement Houses 73
- The Cause of Overcrowding 73
- Dangers from Damp Walls 74
- Need of a Sanitary Protective Association 74
- Repairing the County Building Drains 74
- Posting Contagious Diseases 75
- The Future of Water Gas 75
- Proposed Electrical Railway 75
- Overworking Young Children 75
- The Disposal of City Garbage 75

HOUSE DRAINAGE AS IT IS 76
THE DIFFUSION OF GASES 77
PRIORITY IN PLUMBING LAW 78
THE CRIMINAL SPREAD OF INFECTION 79
HOUSE RENTING AGENTS AND TENANTS 79
LEPROSY IN THE SANDWICH ISLANDS 80
SMALL-POX STATISTICS 80
THE WORK OF THE TENEMENT INSPECTORS 81
SANITARY WORK IN MICHIGAN 81
POTTS AND THE PLUMBER 82
PROGRESSIVE PLUMBERS 82
ON THE DRAUGHT OF CHIMNEYS 82
ORIGIN OF THE ARCH AND VAULT 82
DEATHS FROM PREVENTABLE DISEASES 82
CURRENT PUBLICATIONS 83
NOTES AND NEWS 83
BUILDING INTELLIGENCE 84

THE SANITARY NEWS receives pleasing encouragement from London. *The Lancet* says: "We have received the first two numbers of THE SANITARY NEWS, a new journal of public health which is being issued in Chicago. The journal is intended to deal in the main with questions affecting house-construction, the sewerage of towns and villages, water-supply, food-supplies and their adulterations, etc., and also to record the most recent intelligence with regard to matters affecting public health, both in America and elsewhere. It is the intention of the publisher that the journal shall be of a scientific character, but at the same time that the information it affords shall be so compiled as to give instruction to those who are not well versed in the technicalities of the several subjects which will come under discussion. Viewing the journal from this point, it is evident that it has commenced its career successfully, and we heartily wish it well." Dr. George B. Frothingham, of Michigan University, says of THE SANITARY NEWS in his paper, *The Ann Arbor Register:* "As it bears the outward signs of prosperity, and is ably edited, we think it safe to congratulate the citizens of Chicago on having reached a point in civilization which will enable such a journal to be maintained." Such words of commendation come from every source.

THE Citizens' Association is giving attention to the tenement house population of the city with a view of erecting some model homes for this class of our people, and there are several gentlemen connected with the Association who are ready to furnish the means when proper plans are developed and sites selected. The Association has never undertaken a more public spirited or commendable work. Messrs. B umann, Randall and Ducat, the committee selected to consider the matter, met at the rooms of the Association on Thursday afternoon, the 26th inst, and invited Dr. De Wolf to give them his views on the subject. It is probably true that the tenement house question has received as intelligent and comprehensive a study and treatment by the Health Department of Chicago as it has ever received by any public officials in the world. At least this is affirmed by recent high authority in England. Dr. DeWolf pointed out the location for work, and its necessity, and particularly dwelt on the great need of a large and well-conducted bed-house for young men in the neighborhood bounded by the river and Halsted street, between Monroe street and Washington Boulevard. In this section hundreds of young men congregate every evening. The rooms which they occupy are cold, and they have no other places in which to keep warm, or where they can meet each other, but the saloons and low dives of that quarter. The doctor believes that a clean bed in a warm and clean room, or dormitory, with a large and well-lighted and warmed reading room in the building would attract them, and that they are a class of mechanics and laboring men, willing and able to pay for such a home, —indeed, the expense ought to be less than they are now paying for the accommodations they have. Such a building would be the best of temperance reforms—a daily influence for good on men's lives. The committee was much impressed, and one gentleman remarked that he was personally acquainted with a mechanic in an iron foundry in the neighborhood who left the city because he could not find such a home within his means. The committee will meet again this week and under the escort of the doctor and a tenement-house inspector visit several localities that need improvements. Our citizens of all classes will rejoice if the Commissioner of Health's infection with tenement-house fever is communicated to every member of the Association.

IT is expected by the Association that the committee will not only look into the physical discomforts and unsanitary habits and surroundings of those who live in tenements, but also endeavor to find out what effect all this has on moral life. The committee probably does not realize what a stupendous undertaking it has on hand. A good many factors are to be taken into consideration in determining the evils and inconveniences of tenement life, and when it is found that some of them most plainly seen, such as

overcrowding, bad plumbing, or no plumbing at all, unsewered and unpaved streets and foul alleys, cause disease, and incite to crime, or promote shiftlessness, it may still be true that poor and degraded people will not be benefited very much by correcting these faults. Those who need help should first be taught to help themselves. It will not mend matters much to provide better accommodations and improve surroundings unless those who are to benefit by them appreciate it. Overcrowding is not so much a matter of necessity as might be supposed; neither is the filthiness of closets, out-houses and back-yards. Large families may be found living in a single room,—and sometimes there are two or three of them in a single room,—not because there are not more commodious quarters to be had, but because the occupants are too lazy to work. If humble quarters are not kept clean without the constant supervision of municipal authority, brick houses on paved and sewered streets would, if occupied by the same people, become filthy pens, and hot-beds of disease. The most that can be done by the committee is to determine exactly what the sanitary defects in tenement-house construction are and indicate, for the public good, how tenements should be built hereafter. The agitation of this question may lead to the organization of a Public Improvement Society, such as exist in foreign countries, which will see that tenement houses, as well as other dwellings, are constructed for ornament and the promotion of health, as well as profit. But it is not to be forgotten that the Health Department, or that branch of it known as the Tenement and Factory Service, has been doing systematic work in this line for two years or more, and the efforts, in helping the poor people to understand what is best for them, are more effective than bushels of official reports and ill-conceived legislation. It is to be hoped that something more will come of the investigations of the committee than smoke, in which so many undertakings of the Citizens' Association disappear.

It would be well for those who move into new houses in the spring to make careful inquiry as to the time when the walls were put up. The increased and unsatisfied demand for houses in this city has induced builders to press their work to completion in spite of cold weather. During the open fall the foundations for many new buildings were were laid; under ordinary circumstances the work would have been postponed until spring. Once begun, the temptation to complete a building has been so strong that walls have been built up in every part of the city when it was so cold that mortar froze, if not as soon as spread, at least during the succeeding night. Such buildings are not fit to live in. The walls will be damp for years, and will be quite sure to cause sickness. A sewer-builder related the following a few days ago: He had been summoned to a house on Prairie avenue to discover the cause of apparent leakage from some unknown source in the basement. The occupant had an impression that the water came from a sewer. It was soon found that the water, which stood in little pools over the cemented floor, was not sewage. The conclusion was then that it came from the service pipes; but they were found to be absolutely tight. It was finally discovered that the water had been dripping down the inside of the walls, inside the plastering, and, arrested by the cemented floor, had spread out over it and formed the pools spoken of. These invariably evaporated during the night, but the hollows filled again when the sun began to warm the walls in the morning, and the dripping continued during the day. Had there been a wooden floor in the basement, the water would have escaped into the earth and no one would have known it. Inquiry revealed the fact that the house had been built during the previous winter, and an examination of the mortar behind the plastering showed that it was as soft as when laid. It needs no argument that such a house should be avoided. The one in question was in a fashionable South-side block.

The county commissioners have finally directed the architect of the Cook County Jail and Criminal Court Building to repair the defects found in the drainage, ventilation and heating of that building. But as the architect is disposed to charge up the defects to somebody else than the architect, insisting that the original plans were correct and everything in good condition when he left it, it is evident that the few thousand dollars which will be placed at his disposal for repairs will be simply wasted. The reports of Inspector Genung to the Grand Jury, and of Mr. Murray to the commissioners themselves, have been utterly disregarded. The fact is, probably, that the commissioners have no interest whatever in the matter except to check the complaints which were being made, and they will seem to be saving money by spending it on repairs, although quite useless, rather than in tearing out and building anew, notwithstanding the latter would cost less in the end. It is understood that the last Grand Jury were considering the question of indicting the commissioners for their criminal neglect in this matter at the time the latter made a show of doing something. It is safe to say that, if the old sewers are cleaned out, traps put in at the foot of the soil-pipes and the fan set in motion, it will not be a month before the fan will cease to run, and that within a year the building will be as seriously cursed with foul air as it is now.

Chicago is greatly in need of a Sanitary Protective Association, whose object shall be to inspect premises to be occupied as residences, and make such recommendations as are necessary to keep them in a sanitary condition. The work of the Inspection Service of the Health Department extends no farther than to the tenement houses, and, simply because there is not sufficient trained help, only a portion of these can be reached. There are probably not a dozen residences in the city which should not be visited and examined by a sanitary engineer. Some few may be so ventilated, drained and heated that they are safe habitations, but the chances are that quite all have defects which ought to be remedied. It is not practicable to tear down present buildings and put up new and better ones, nor to substitute drains and plumbing fixtures which shall be without defects; but those in existence may be made tolerably safe and kept so by constant watchfulness. In Newport, Rhode Island, when, upon inspection, the premises of a member of the Sanitary Protection Association are found in a satisfactory condition, or if recommendations which have been made have been complied with, a certificate to that effect is furnished if desired. The Association has recommended

to persons hiring houses in Newport to ask for evidence that the premises have been pronounced in safe condition for residence by one of its inspecting engineers. The recommendation applies to boarding-houses and hotels.

In discussing the "radical health ordinance" passed by the city authorities of Paterson, New Jersey, *The Medical Record* says with reference to placarding a house in which there is a contagious disease: "This plan of home advertisement of contagious disease has been tried in Chicago, if we remember correctly. It there failed because the people did not like it, and there were constant evasions of the law." The editor has evidently been misinformed. The placing of warning cards on all houses infected with scarlet fever was commenced in this city in 1877 with considerable opposition from householders and others who attempted to create a public sentiment opposed to the execution of the law. The State Board of Health, with all the prominent medical gentlemen of the city, sustained the Commissioner of Health in placing the cards, and all opposition has disappeared. A very mild form of scarlet fever is now prevalent in the city. More than six hundred cards are in place on the outer doors of city domiciles, and the public has become so thoroughly convinced of the propriety of the warning card that citizens make haste to report to the Health Department all cases coming to their knowledge, and which have not been previously reported through the failure of the family to employ a physician. Only smallpox and scarlet fever are placarded in this city.

Prof. C. V. Marx, in a paper recently read before the Engineering Society of Stuttgart, a translation of which is published in *Van Nostrand's Engineering Magazine*, states his belief that water-gas has a "future before it," and in a limited sense may justly be designated as the "fuel of the future." The heating power of water-gas is about four times that of generator gas. The cost of producing water gas, however, must be considerably lower than that of illuminating gas in order to compete with it as a heating material This is possible, as the cheapest combustible matter may be used, and the whole material is converted into gas by a process which is much cheaper than the ordinary coal-gas process. It may even now be of advantage in large gas-works to use a water-gas furnace in connection with the retort furnace during the time of greatest consumption in winter, and to prepare carburetted water-gas to mix with the ordinary gas. Such gas is easily made of illuminating power equal to that of the best coal-gas. If water-gas can be made sufficiently cheap, which can hardly be questioned, and if gas lighting should be surpassed in the future by electric lighting, illuminating gas will not even then be entirely abandoned, and heating gas will be carburetted by the consumer at his house by a special apparatus, using petroleum, naphtha or some such material to give luminosity to the gas. Water-gas, owing to its high per cent. of carbonic oxide, is very poisonous, as also is common illuminating gas. The latter has, however, the estimable property of smelling so strongly that one-ten-thousandth of it can be detected in the air by its odor. Water-gas, on the other hand, has hardly any smell. This last objection may be met by mixing with the gas some strongly-smelling volatile matter, a device which presents no great technical difficulty.

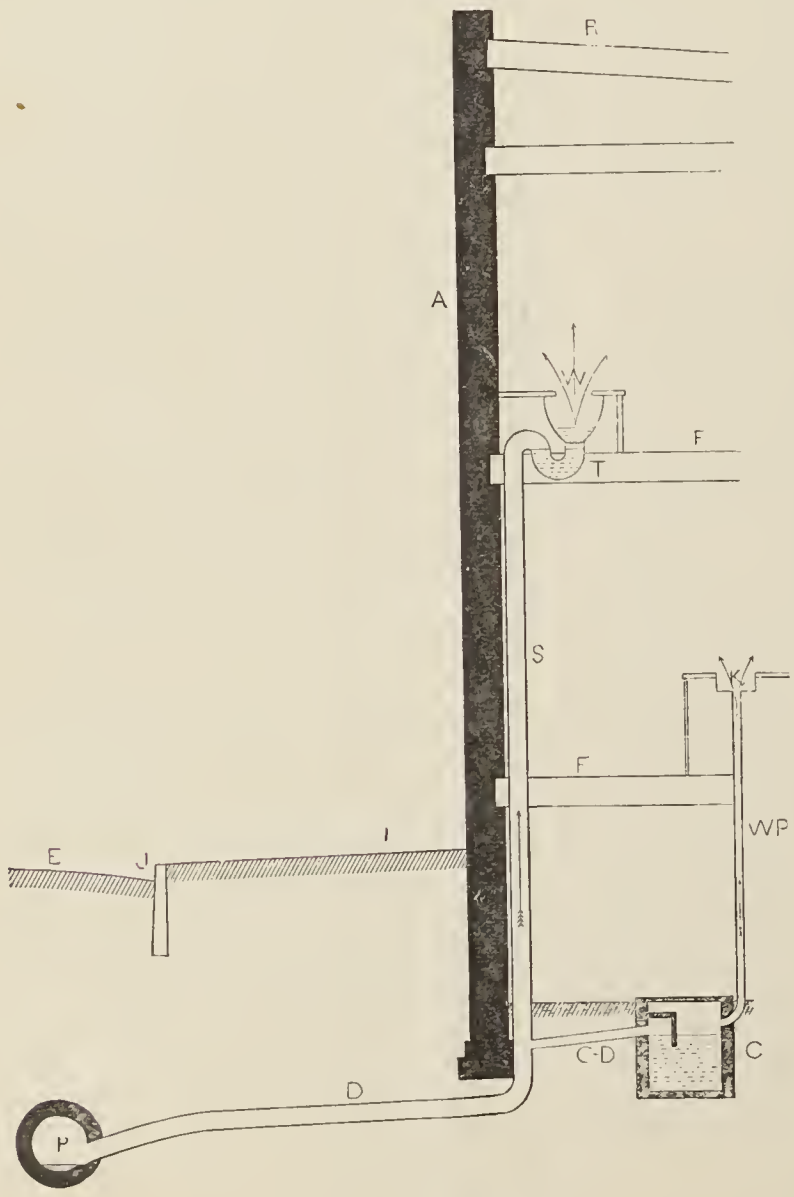
The Chicago City Council was recently asked to grant the right of way on certain streets to an Elevated Railroad Company. It was proposed to operate the cars by electricity. Several exhibitions of the method of propelling the cars were made and were pronounced quite satisfactory. But the matter was no sooner broached to the council than remonstrances were set on foot and public meetings were held in different parts of the city to protest against granting the franchise. More than nine-tenths of the frontage on State street was represented in a remonstrance against the construction of an elevated road on that thoroughfare. It was finally contended that an elevated road did not come within the category of those roads for the construction of which the consent of a majority of the property-owners was needed, but the Corporation Counsel decided otherwise. No reason has yet been given why the Electric Light Company can not operate its cars on the ground as well as in the air, and the matter may be heard of again. It is doubtful, however, if any new street railway company can get a foothold in this city so long as aldermen are so susceptible to the influence of money as many of them have notoriously been for years.

Alderman Lawler, of this city, has interested himself in the young children who are employed in factories and stores, as messengers, etc., and is endeavoring to secure municipal protection for them against the outrageous practice of working them from ten to twelve hours a day. One has only to step into any large store in the city to find cash boys from 10 to 14 years of age, pale and emaciated from long hours and confinement. These lads earn from $3 to $5 a week, not enough to support them properly, considering the fact that they have to dress decently. Such boys are broken down before they reach the age of manhood, and then without education or vigor, become thieves or vagrants, even if the majority of them do not actually die before their beards grow. The fact that they are deprived of the benefit of schools is a very important consideration, and the public has a right to protest on that ground. It would actually be a benefit to merchants to be deprived of their cash-boys, as they would then use automatic machinery for delivering cash and packages, as is already done in many establishments, and at a profit, too. It is said that the cash-boys in the retail store of Marshall Field cost him $23,400 a year. It is also stated that the automatic machinery, which does the work better, can be put up and maintained for less than half that sum.

The disposal of the garbage of this city has become a matter of considerable importance, and a little agitation of the question in the City Council has served to call attention to the pressing need of more funds at the disposal of the Health Department. The Commissioner has been directed to report to the Council, at his earliest convenience, some better plan than the one now in practice for disposing of ashes and garbage; also, as to some suitable dumping-ground for such waste. It has been suggested that a tract of land be bought or rented, outside the city limits, to which the garbage and manure could be hauled on railway trains. It is necessary that something should be done in this matter, and promptly too.

HOUSE DRAINAGE AS IT IS.

The man who puts himself into the hands of another is not only liable, but almost certain, to be defrauded. If he knows nothing about house-building he can no more get a good house built than he can buy a good suit of clothes, if he has no appreciation of the superior value of woven goods as compared with shoddy. If there were no restraints in business, men would prey upon one another just as they would in society. Absolute freedom means barbarism. This established fact in social science has the same application in sanitary science. A man would have a remarkable house who directed an architect, a builder, a plumber, and a hundred other specialists whose services are demanded now-a-days, to "go ahead and put up my house," without a word of direction as to the style of architecture, materials, furnishings, etc.; and yet this is precisely what ninety-nine out of a hundred men do, so far as the plumbing, drainage and ventilation are concerned. The architect has the idea of the man who employs him to develop,—that is, he plans a house which shall represent a style, size and arrangement which the future owner has in mind; the mason is directed to use a certain kind of brick or stone, and the carpenter, this or that kind of lumber. Not so the plumber, so far as the owner is concerned. He is authorized to "see to the drainage," that is, to get the waste out of the house; how, or what material he uses, is of no consequence. Drains and waste-pipes are things that are out of sight and are put to a use unpleasant to think about, so let them be cheap; the lowest bidder can get the job. The result is a competition which absolutely shuts out good work and the use of good material, and drainage is imperfect. A man's house becomes contaminated with his own personal and house wastes, the doctor takes the profits of his business, the undertaker buries his children and the plumber is cursed for it all. There would be as good reason for blaming the cabinet-maker whose furniture fell to pieces on first use, because he had "made it cheap" as ordered.



"MODERN IMPROVEMENTS."

This is preliminary to the suggestion that no man should think of building, or occupying, a house until he knows something about house drainage. It would not take him long to acquire a knowledge of all the essentials of proper house drainage. At any rate, by a little attention to the matter he can soon learn enough to enable him to judge when he should keep out of a building, because it may have improper drainage. The drainage of a house is one of the first things that should be subjected to an examination, if a man is thinking of occupying the premises. The prevailing "system" will be quite likely to be that given in the illustration below. For the benefit of those who have yet to learn the "A B C" of house drainage it may be stated that A represents the front wall of a building, I the sidewalk, J the curb-stone, E the street and P the street sewer. D is the drain leading to the sewer, usually laid about eight feet underground, and S the soil-pipe, which conducts away the matter deposited in the water-closet W. T is a trap under the water-closet, supposed to be always full of water, its purpose being to check the upward flow of the foul gases generated in the sewer, the drain and the soil-pipe. C is a reservoir of brick built in the ground, about two feet square, or two feet in diameter if round, into which all waste from the kitchen sink flows on its way to the main drain, and thence to the sewer. The object of it is to intercept the grease which is mingled with the water which comes from the kitchen, and which, if allowed to go directly to the street sewer, would cool in it and adhere to its sides and in time clog it. This reservoir in Chicago is called a catch-basin. WP indicates the waste-pipe, a name applied to those pipes which empty sinks, wash-basins, etc., in distinction from the soil-pipe which empties the water-closet.

This primer lesson may be supplemented by the statement that the catch-basin, so-called — more correctly a grease-basin—is a foul cesspool. It needs to be in use only a short time before the solid matter in it begins to generate a poisonous gas, or a combination of gases, which is bound to escape. This is no difficult matter, usually, as the grease-basin is commonly covered with a few loose boards, or the waste-pipe itself affords a ready means of escape, as shown in the illustration. A pretense of a precaution is generally made to keep the gases of the sewer from escaping through the grease-basin by an overhanging partition, as indicated. Such house drainage as this has until recently met the requirements of the law, and in all its remarkable simplicity it will be found in most houses in Chicago which were built prior to the passage of "an Act for the regulation and inspection of Tenement and Lodging Houses, or other Places of Habitation, approved and in force May 30, 1881." In fact the law never had anything to do with the construction of house drainage in Illinois, prior to the passage of this Act, except, as already stated, to require the construction of the intercepting grease-basin for the protection of

the street sewer. The sewer was considered of some value and must be kept from injury; human life and health were of no consequence. A variation from the plan given was to place the grease-basin outside the walls of the house, a humane accident. In such instances there is less danger to fear from it, provided the waste-pipe is trapped, another lucky chance. There may be more than one soil-pipe in a house, though two or more water-closets are usually attached to one. So there may be numerous waste-pipes, but those from the wash-basins, bath-tubs. etc., usually connect with the soil-pipe. The "system," however, such as it is, is clearly shown. If an examination is actually undertaken all the pipes which are here so clearly shown will be found hidden away in partitions, or in the very walls themselves. No person should take his family into a house until he knows just where they are and what their condition is.

THE MATERIAL USED.

The second illustration here given shows of what material existing house drainage is made. W is a water-closet which is in itself an abomination. Not all water-closets are such, but this particular kind is cheap; nobody wanted any better, simply because he never knew that there were grades in quality, in water-closets and it was almost universally used. T is a trap, made of lead, and connected, always imperfectly, with the iron soil-pipe S. The latter in turn connects with a drain of baked clay, always several inches larger in diameter, and consequently the two are imperfectly jointed. The short sections of the drain pipe are supposed to be cemented together, but this is generally a delusion. The result is sewage leaking out into the ground. There are defects which will be enumerated hereafter, and more definite directions given for finding them out.

Architect G. H. Edbrooke, who left this city recently for a European trip, was on board the ill-fated City of Brussels, when she was run into by the Kirby Hall and sunk at the mouth of the Mersey. As none of the passengers were lost, Mr. Edbrooke is safe. He will remain abroad until about the middle of March.

Chicago will build extensively in the spring.

THE DIFFUSION OF GASES.

Fairbank Hall was well filled on the evening of January 18, the occasion of the first lecture before the Chicago Master Plumbers' Association. It was expected that Dr. A. Reeves Jackson, President of the College of Physicians and Surgeons, would speak on "Sanitation." In introducing him, Mr. Andrew Young, Chairman, said: "Ladies and gentlemen, on behalf of the Plumbers' Association I bid you welcome to this our first lecture on sanitation. The attendance here to-night shows that the interest in this subject is felt pretty thoroughly. It is the intention of our association to have public lectures from time to time on sanitary subjects, a course that will benefit ourselves and strengthen the hands of our Health Department."

The Doctor disappointed the audience by announcing that he should not deliver a lecture; but they were pleased when he said: "I think it is the first time that I have ever seen the plumber and his helper when I had a degree of pleasure. Indeed, until quite recently I have had the impression that a plumber was the natural enemy of mankind, and that his work was entirely at fault and in opposition to that of the doctor; that while the aim of the doctor was to dose, that of the plumber was to bewilder and destroy. I have thought that there was but a single thing in common between the two; namely, that both when they had made a mistake,—had done a bad piece of work,—were anxious to have it hid from the eyes of the world as quicky as possible, the plumber to do this having at his command lath and plaster, and the doctor six feet of earth. As for the helper, I have regarded him simply as a fiend, worse only, if possible, than the plumber himself. But I am a changed, a converted man. I have learned to know the plumber as he is, and to know the helper as she is, and henceforth I am on the side of the plumber, and the more ladies he has the more I am on his side. But I didn't come here to-night to lecture on sanitation. I come before you simply to apologize, and I am not quite sure but that, as I am not going to lecture, it is right and proper that you should know why. One week ago a committee of one of your number came to me and said: 'We are an abused class; the public don't understand us and our high aims; the public think that the only high things about us are our charges; they think that we are not human, that we are only plumbers, that we are men, and being plumbers we have an association. Don't attempt to instruct us. The members of that association have too much knowledge already and they don't want any more. They are discouraged at their position and they want encouragement; they are sad and want something entertaining.' I should have been proud to talk about the Board of Health, the principles of sanitary science, small-pox, house drainage, bacteria, and all that, but you would not have it so, immensely valuable as the information would have been." He concluded by introducing Dr. J. J. M. Angear, who had consented to fill his place.

Dr. Angear spoke for an hour on "The Diffusion of Gases," impressing very forcibly some of the common, yet often disregarded, facts of physics. He gave the composition of the atmosphere, explaining that oxygen is the fuel of life, nitrogen a diluting gas, and carbonic acid gas the

product of combustion. He showed that, necessary as oxygen is to life, man could not live breathing it alone; in fact, if the oxygen were all precipitated to the surface of the earth everything would be immediately consumed; also, that if the carbonic acid gas in the atmosphere were to settle upon the face of the earth, man would perish as quickly as though at the bottom of the ocean. If the diffusion of gases were, then, a wise provision of the creation, it is also an established and unalterable fact. Every gas is a vacuum to every other gas. Set free in a room the particles of one will flow between the particles of another as water through a sieve. This law holds good with carbonic acid gas, which is one and a half times heavier than air. It was formerly believed that this gas would invariably fall to the ground, and it was on this account undoubtedly that beds were made so high that it almost required a step-ladder to get into them. The speaker said that he had himself seen holes bored in the floor through which this gas was expected to escape. While the diffusion of carbonic acid gas was slower than that of other gases, it was as certain as that of any. It had been demonstrated that gases would penetrate stone walls, to say nothing of simple board partitions. The gases which escape from sewers, even in the street, were liable to impregnate the air breathed in houses, because of the absolute certainty of their diffusion. It was, also, impossible to prevent the escape of gases from sewers; they would be absorbed by the water in traps on one side and given off on the other; and would even penetrate the brick walls of sewers however thick they might be. Traps were no security unless the water in them was continually changed. To show that foul gases were injurious to health, whatever their source, Dr. Angear referred to the former unsanitary condition of Kensington, the suburb of London. At the Potteries there lived thirteen hundred people who kept three thousand pigs. The town was undrained and without a system of sewerage. The death-rate ran as high as forty-eight, but within two years after the sanitary condition of the place was improved, it was reduced to five. The speaker found in this an illustration of the probable effects of the stenches which come from the Stock-Yards, practically within the limits of Chicago, where there are 118,000 head of pigs, sheep and cattle. The ammonia escaping from the decomposing filth settles down like a pall over the city and is diffused through every house. Its effect must certainly be deleterious and the cause of the nuisance ought to be and must be removed.

The speaker had something to say about curtains, upholstered furniture and carpets. These catch and retain for an indefinite time the germs, or poison, of disease and give them off when least expected. If anyone had any doubt about the unhealthfulness of carpets let him watch the particles of dirt and wool darting about in a sunbeam when a carpet had been trodden, or played, upon by children. If the speaker had authority he would send to the penitentiary every man who dared to make a carpet. He almost believed that carpets had killed more children than there were threads in them. The plumber was not guilty of spreading all the diseases that strike down helpless children and destroy the health of older people; the weaver had something to do with it. The speaker concluded by calling attention to the fact that the field in which sanitary effort might be applied was a wide one, and urged that it was important to recognize the laws of nature and truth. Truth was not the dictum of any potentate, but was itself a monarch, ruling with an iron hand. A recognition of these facts and an endeavor to live in accordance with them would prolong life and increase happiness.

It was announced by Mr. Young at the opening of the meeting that the second lecture in the course would be delivered some time this month.

PRIORITY IN PLUMBING LAW.

Illinois was the first State in the Union to pass a law which regulates the plumbing, drainage, ventilation, lighting, etc., of a habitable building, notwithstanding the recent claim that Chicago is a convert to the New York system. New York followed very closely in the footsteps of Chicago, and has done some things better, it may be, as any one may profit by another's experience. On the whole, the system of regulating tenement and lodging houses, and other places of habitation in Chicago, has no equal in the world, as indicated in the recent communication of Hon. Mr. Burdett to *The Lancet*, published also in THE SANITARY NEWS. Very soon after the State law was passed, the city council passed the revised ordinances, which cover the same ground and clinch the authority given to the Health Commissioner. Lest those cities which have since acquired authority to regulate the sanitary condition of houses, or expect to soon, may be laboring under the delusion that they ought to be grateful to New York for setting an example in this matter, the substance of the Illinois law, in force May 30, 1881, is here given. Its provisions are as follows:

1. It shall be the duty of any architect or architects, builder or builders of, or other persons interested in, any projected tenement, lodging-house, or other places of habitation in any incorporated city of fifty thousand inhabitants, to submit plans and specifications of any such building, or buildings, to the health commissioner, or commissioners, of such incorporated city, that the said health commissioner or commissioners may examine the plans and specifications, for approval or rejection as to the proposed plans for the ventilation of rooms, light and air shafts, windows, ventilation of water-closets, drainage and plumbing.

2. It shall be the duty of any plumber or other person or persons interested in the contract for the plumbing work of such building or buildings, to receive a written certificate of instruction from the health commissioner, or commissioners, before commencing work on the building, or buildings, and to proceed according to the plans, specifications and instruction, as approved by the health commissioner, or commissioners, of said city.

3. It shall be the duty of any plumber or other person or persons interested in the plumbing work, after its completion, and before any of the plumbing work is covered up in any building, or buildings, or on the premises, to notify in writing the health commissioner, or commissioners, that the building, or buildings, or other premises, are ready for inspection; and it shall be unlawful for any plumber or other person, to cover up, or in any way conceal such plumbing work, in or about such building or buildings, until

the health commissioner or commissioners approve of the same.

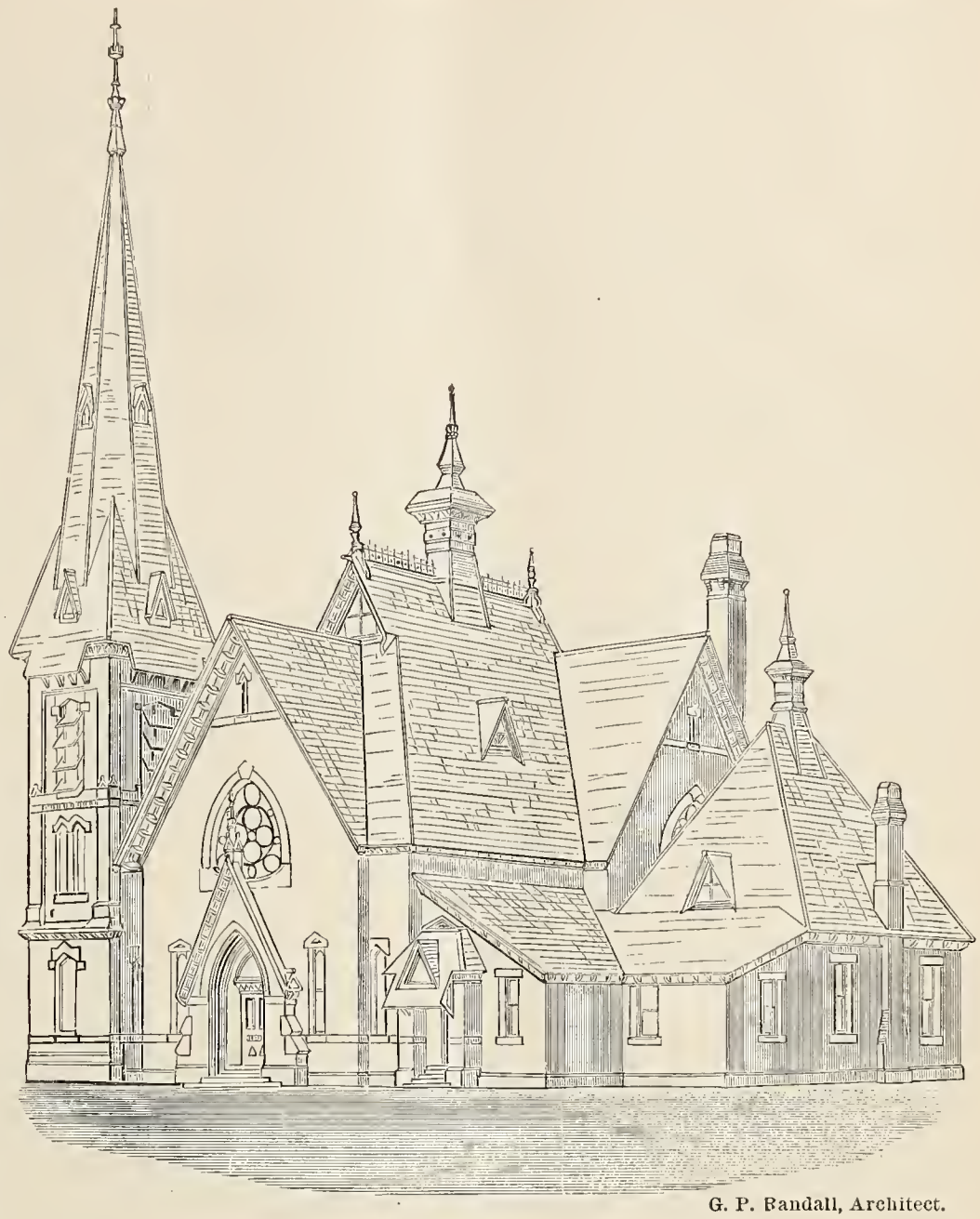
4. If any architect, or architects, builder, or builders, violate any of the provisions of this act, he or they shall be fined in a sum not less than $100, nor more than $200 for each offense.

5. If any plumber or other person or persons interested in the plumbing work, violate any of the provisions of this act, he or they shall be fined in the sum of not less than $100, nor more than $200 for the first offense, and the further penalty of $10 for each and every day such plumber or other interested person or persons shall, after first conviction, neglect or refuse to comply with any provisions of this Act, or the written instructions of the health commissioner or commissioners, and for the second offense, a like penalty and a forfeiture of his or their license to do business in said city for one year after conviction.

6. Inasmuch as the health of the people is endangered, an emergency exists, requiring this act to take effect immediately; therefore, this act shall take effect and be in force from and after its passage.

THE ILLUSTRATION.

The design given above is for the Congregational Church at Fargo, Dakota, another view of which was given in the last number of THE SANITARY NEWS. The sketch may be of interest as showing more of the building than was shown in the other illustration.



G. P. Randall, Architect.

DESIGN FOR CHURCH AT FARGO, DAKOTA.

THE CRIMINAL SPREAD OF INFECTION.

Judge Dixon, of New Jersey, in a recent charge to the grand jury of Paterson, called their attention to the case of a man employed at the pest-house in that city as nurse to a small-pox patient, and who, having the germs of the infectious disease about him, went recklessly to his family, communicating the disease to his children, one of whom died. In commenting on this case, he said: "If a man, conscious that he carries about with him the germs of a contagious disease, recklessly exposes the health and lives of others, he is a public nuisance and a criminal, and may be held answerable for the results of his conduct. If death occurs through his recklessness, he may be indicted for manslaughter. It is held that where a person knowingly communicates a contagious disease to another, and death results, the crime is that of manslaughter." Judge Dixon furthermore added: "He may be indicted also for spreading the disease by conscious exposure of others thereto by his presence in public places, such as on the streets, in halls, etc. He might be indicted as a public nuisance for endangering the public health in this way, even if no consequences had followed. The law provides some penalty for such offenses against the public safety."—*Boston Medical and Surgical Journal.*

HOUSE-RENTING AGENTS AND TENANTS.

To protect themselves and their clients against dishonest and immoral tenants, as they put it, the renting agents of this city have effected an organization. One of the avowed objects of the association is to prepare a "black list, to be accessible only to members." This "black list," it is expected, will contain the names of tenants who do not pay their rent promptly, or who abuse the premises which they occupy. The knowledge which one agent may have about a dishonest tenant will thus be accessible to all who are members of the association. While there can be no objection to securing mutual protection against a considerable class who abuse the confidence which must necessarily be placed in a tenant, there is danger that honest tenants will suffer the disgrace of being posted with the disreputable. Tenants are too often lured into houses which look well on the outside and seem to be all right within, which are really unfit to live in. The tenant does not find this out until he has signed a lease for a year and moved in. The drains are broken and waste-pipes leaking, grease-basins choked with filth and sending their foul gases back into the house, the roof leaking the first rain-storm, no cold-air duct to the furnace, and so on. The tenant protests, but the agent laughs behind an iron-clad lease. If the tenant refuses to pay his rent until the defects are remedied, he is sued or his effects tumbled into the street. This is no fancy. It has all often occurred. A most worthy and well-

to-do gentleman of this city found the foul gases of the street sewer escaping into his house on Indiana avenue soon after he rented it. He lost one of his children in consequence, and spent some hundreds of dollars to save the life of his other one. He found that there was a serious defect in the construction of the main drain, but the agent refused to have it remedied. The tenant then refused to pay his rent and was sued for it. He was defeated in the Justice court, but appealed to a higher court. His death a year ago ended the suit. This man's name would have appeared in the "black list" had there been one. The landlord is usually inaccessible; thus the tenant is at the mercy of the agent who is merely an agent, having no authority, as he claims, to do anything but collect the rent. A gentleman, who owns several houses, said a short time ago, that he did not know a single one of his tenants by sight or name, and he did not want to; if he dealt with them directly he could make no money. All things taken into consideration the tenant has the worst of it, and he is likely now to be treated more severely than ever. It remains for him to post himself on the requirements of a healthy and comfortable house, and be satisfied that he is getting what he bargains for before he occupies it.

LEPROSY IN THE SANDWICH ISLANDS.

They have their little family troubles in the Sandwich Islands as well as in more pretentious Kingdoms, and the Government is castigated by a Hawaiian paper, *The Gazette*, because it has been "spending thousands of dollars on a vain show, the coronation of the King," instead of devoting the money to the relief of lepers. It appears that in 1880, the legislature appropriated $174,500 for the use of the Board of Health, $85,000 of which went to the benefit of the Leper Settlement. In 1882, the total was increased to $237,500, of which the Leper Settlement got $90,000 direct, and $10,000 went for a water supply for the settlement. The Government physicians got $50,000, hospitals, $50,000, and $35,000 was appropriated for general expenses. A doctor on one of the islands wrote to the Board of Health two or three months ago for instructions with regard to leprosy. He said that there were about one hundred lepers on his island. Some were bad cases and some were light. Two cases were in the very last stages, "horrible, repulsive and dangerous." The condition of these two cases was described, and a request made that they should be removed to the Leper Settlement; but the Premier replied that he had not the funds, when at the same moment he was prepared to spend, the complaint runs, and was spending, money freely for the approaching coronation. *The Gazette* thinks that "the pure gold of the crown would rot on the brow of the Sovereign, whose coronation had been hurried on at such a cost," and adds: "If there was not money enough to send away those unfortunate lepers from Kauai, how is it that the present incumbent of office could sanction the expenditure of so much for crowns and such like trash, so much for additions to the palace and outbuildings which were not authorized, so much for almost everything that was a folly and was not a necessity to the nation, when there was a hideous ogre at their doors which was menacing every family on the islands, which would crawl insidiously into the purest homes. Knowing what the people resident here know, the coronation ceremonies, far from being joyous will call up far more than the grinning skeleton of the Egyptian feast; it will rather recall the scene from Dante's Inferno, the gorgeous panoply of royalty surrounded with a mass of writhing, slimy, venomous serpents, the true symbols of disease."

SMALL-POX STATISTICS.

The coincidence between the greater or less prevalence of small-pox, and the greater or less immigration, is shown in the appended table of small-pox mortality in Chicago, which Dr. Rauch, Secretary of the State Board of Health, compiled from various sources, embracing his own unpublished memoranda, made while Sanitary Superintendent of this city. From this table it will be seen that between 1851 and 1858 there were deaths from small-pox each year, the maximum being reached in 1855. Records show that immigration into Chicago, both for permanent residence and for distribution, first attained important proportions in 1853, and continued until 1858, when it was checked by the results of the panic in 1857. From June, 1858, until the close of 1862, there were only 11 deaths from small-pox in Chicago. But in 1863 there were 115 deaths, and up to the end of June, 1865, there had been 453 deaths. During this period, that is, from the beginning of 1863, immigration again revived, and although some share of the small-pox cases was contributed from the large number of soldiers and prisoners of war at Camp Douglas, the great majority were among newly-arrived immigrants and their friends. This revival continued with little change until the spring of 1872, although it was temporarily interfered with by the prevalence of cholera in 1866. In 1872 there was a marked increase of both foreign and domestic immigration into Chicago, attracted by the rebuilding of the city after the great fire. The deaths from small-pox during this year were 655, and up to the close of the epidemic, then begun, were 1,321. Immigration gradually declined from this point until it reached its minimum in 1879, as a result of the prolonged hard times. For the 16 months which ended November, 1879, there had been no death from small-pox; but in March, 1880, simultaneously with an unusual increase in immigration, began the first cases of the epidemic of 1880–'82. What is true of Chicago in the coincidence between immigration and small-pox is said to be substantially true of the Northern States generally, through which, or into which, immigration flows.

The attention of Dr. Rauch was forcibly attracted to the relation of the immigrant to small-pox re-appearance, as cause and effect, by an official experience in Chicago, during the epidemic of 1871–'75. For nearly three months, in 1871, there had not been a single case of the disease in the city; when, on the 17th of October, seven days after the great fire, a party of immigrants arrived from New York, just landed from a Hamburg steamer, and took up their abode in the already overcrowded houses of friends in the Seventh and Eighth wards. As it subsequently transpired, three of the party were suffering from small-pox on their arrival; but in the confusion which followed the destruction of the city, nothing was known of this fact until the death of one of their number was reported, October 29. This led to an investigation which disclosed the two surviving cases, and three new cases among their friends in the Seventh, and two in the Eighth wards. From these, despite such efforts as could be made under the circumstances, the disease rapidly spread, so that, in November, there were 44 cases in the immediate neighborhood of the original group, and 24 others scattered throughout the city, nearly all among foreigners. In November, another immigrant arrived with the disease, and in December, two more. By this time the contagion had spread to nearly every part of the city, 223 cases and 47 deaths occurring in December. Every effort was made to subdue this additional calamity, among other measures rigorously enforced being the vaccination of the large numbers who obtained supplies from the Relief and Aid society; and — notwithstanding the cold weather, which is an important factor in the propagation and spread of small-pox — the disease was substantially held in check, until the month of March, when large numbers of immigrants began to arrive, attracted by the demand for labor in re-building the city, and the high rate of wages then paid. Among these arrivals there was the usual proportion of infected — eighty cases, in all, being removed from railway trains at

the various depots during the season. Checked by warmer weather, its epidemic proportions were still maintained by immigrants arriving during May, June, July, August and September; directly increased with the increase of immigration in October, which increase was thenceforth maintained by the cold weather, through the winter of 1872–3; declined with rise of temperature in March, but again increased with the arrivals of immigrants in April, and continuing without marked change, until the October immigration and falling temperature, caused a still further increase during the fall and winter. In January, 1874, however, the diminished susceptibility of the population, and the amount of vaccinal protection which had been secured, resulted in a marked decrease, which was maintained until the following April, when the usual influx of immigration was followed by the usual increase in the number of cases; this increase continuing until the end of July, then declining until October, when there was an increase (immigrant,) which was lost in Novembe and December; increased in January, 1875; declined in February andr March; increased in April (immigrant) and finally disappeared in July, after a continuance of forty-seven months. A similar experience is related by Dr. Oscar C. De Wolf, present Health Commissioner of Chicago.

The following is the table of mortality from small-pox in the city of Chicago, from 1851 to 1882 inclusive·

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.
1851	....	....	....	1	2	....	....	1	....	...	1	...	5
1852	2	....	....	....	....	....	2	4	....	1	...	....	9
1853	2	2	1	2	2	4	....	1	....	1	1	3	19
1854	1	1	1	2	2	....	2	....	....	....	1	2	12
1855	8	6	2	5	1	1	2	1	. .	....	1	3	30
1856	5	2	2	4	2	1	....	....	....	....	....	....	16
1857	1	....	....	3	1	2	....	2	...	....	1	....	10
1858	1	....	....	1	1	2	...	....	....	..	....	....	5
1859	....	....	....	...	...	....	....	....	.	..	...	....	....
1860	....	....	....	...	....	1	1	....	....	1	...	....	3
	20	11	6	18	11	11	7	9	....	3	5	8	109
1861	....	...	....	....	....	....	...	...	1	....	2	....	3
1862	1	1	...	....	....	....	...	....	....	....	....	3	5
1863	4	9	8	9	7	11	4	4	7	10	16	26	115
1864	55	40	37	35	32	19	25	8	6	3	11	12	283
1865	8	18	17	4	5	3	....	1	1	....	....	....	57
1866	2	....	..	....	1	....	2	1	1	....	....	2	9
1867	1	5	3	8	3	4	8	11	13	20	19	28	123
1868	39	33	35	13	15	11	2	...	....	....	...	2	150
1869	1	1	2	2	3	3	2	1	3	...	....	....	18
1870	1	1	....	3	2	5	2	1	....	...	....	....	15
	112	108	102	73	66	54	45	27	32	33	48	73	778
1871	2	2	....	1	1	3	3	..	....	1	13	47	73
1872	65	54	97	80	68	69	26	29	.20	27	63	66	655
1873	62	53	35	41	56	45	52	31	33	32	36	36	515
1874	24	11	8	17	14	7	7	1	1	....	....	....	90
1875	....	2	3	3	1	1	....	....	....	....	....	....	10
1876	....	....	3	5	6	4	3	1	1	3	2	....	28
1877	....	....	1	3	2	2	4	7	7	4	5	8	43
1878	7	5	2	4	....	....	3	....	....	....	....	....	21
1879	....	....	....	....	...	....	....	....	....	....	.	1	1
1880	....	....	...	9	4	10	3	1	2	3	1	10	43
1881	29	34	31	39	68	61	83	51	116	188	206	274	1180
1882	271	224	201	123	88	34	16	3	4	14	14.	14	1006
	460	385	381	328	308	227	200	124	184	262	340	450	3665

THE WORK OF THE TENEMENT INSPECTORS.

Since the completion of the annual report of the Tenement House and Factory Service of this city, the inspectors have been engaged principally in attending to special cases. In a prominent building on State street, the lower floors of which are used for fashionable stores, and the upper for elegant offices, the water-closets were found under the stairway, the soil-pipes and the closets both without ventilation. The latter had not even an outside window, and the doors in some cases opened directly into the offices or stores. The owner said he could not object to the reasonable complaint which had been made by his tenants, but, like a helpless child, asked: "What am I to do?" He consented willingly to follow the suggestion of the inspector to have the soil-pipes and traps well ventilated by pipes extending to and above the roof.

A private school on the South-side received attention. Fifty young ladies were found studying in a single room only 12 x 35 feet in size and 11 feet high. The room was heated by a furnace, but the ingenuity of some ignoramus had once been exercised to save coal. A wooden slide was run through the cold-air duct, and a new flue built up to the hall floor above, connecting with the original fresh-air flue. A register was placed in the floor over this flue. As the air in the hall was warmer than that out-doors it was used to supply the furnace. The register in the hall was only a few feet from the door of the school-room. The result was that the air which the pupils breathed in the morning was returned to them in a continuous circular flow through the door of their room, down one register and up another throughout the day. Those in charge were ordered to close the hall flue and burn up the wooden slide.

Numerous instances of choked sewers were found. In one case the water-supply for an upper story had been cut off by the freezing of the pipes and the inmates were using the water-closets without flushing.

In a five-story building on Randolph street there were found seven families, of eighteen persons, housekeeping on the fifth floor; seven families of seventeen persons on the fourth floor; three families of eight persons on the third floor, and one on the second. There was but one stairway for the escape of these people in case of fire.

In a two-story frame house on West Monroe street the waste-pipes were found emptying into a wooden drain leading to the privy-vault, none of the pipes being trapped. There was a child in the house sick with diphtheria.

SANITARY WORK IN MICHIGAN.

At the last meeting of the Michigan State Board of Health a report on the analysis of some samples of apple butter were presented, which will not be very comforting to the country housewife. It is the custom to make apple-butter in the common wash-boilers of the house. The analysis reported showed traces of lead and tin and some traces of copper. That part of the fruit which came in contact with the cap of the fruit-jar in which it was sent to the chemist gave strong reactions for zinc, undoubtedly derived from the zinc cap, such as is ordinarily used on fruit-jars. A specimen of tinned sheet copper, used in making "copper" boilers and other kitchen utensils, was analyzed. The tin was found to contain a large quantity of metallic lead,—about two-fifths of the tin was lead. From one square foot of such tinned surface there was obtained the equivalent of one hundred and fifty grains of metallic lead. This is acted upon by the acids of the fruits prepared in utensils made of it, and must have an injurious effect on the health of those who eat the prepared fruit. A committee was appointed to make further investigation into the subject of metallic poisoning by utensils used for cooking and storing food.

The Board adopted a resolution commending the efforts to secure legislation with reference to mortuary statistics before the removal of the body of a deceased person, and declaring that the method is applicable to townships and villages as well as to cities.

The committee on legislation reported on an act requiring the registration of plumbers.

Hon. James Heuston addressed the Board on the subject of the examination of new dwellings before occupancy, and the committees on legislation and buildings were requested to take the matter into consideration, with a view to securing a state law requiring all plans for new dwellings to be submitted to the local Boards of Health for approval.

The committee on the disposal of excreta was requested to prepare a pamphlet for general distribution on the disposal of slop-water, garbage, etc., in villages which have no sewerage system, and from detached dwellings.

The committee on legislation was requested to get a Bill before the Legislature making it a penal offense to communicate a contagious disease.

POTTS AND THE PLUMBER.

When Potts began his married life the watchword engraved on his memory was: "Beware of the plumber." The awful destinies of numberless friends who had foolishly been inveigled into poverty and distress by this fiend, loomed up before his eyes, continually reminding him of his motto until he grew to consider himself a public benefactor in endeavoring to suppress this inhuman monster. But in an evil hour during the family's absence in the country the wash-boiler began to leak, and the plumber glided in through the basement door. From that time the house seemed bewitched. Two days afterward the hot-water pipe blew his range to atoms and the servant girl to glory, the boiler began to leak at every conceivable point, and after the second-story basin had been overflowed two days in succession, the parlor ceiling reminded one of a colander, with ancient frescoing between the holes. These repairs had scarcely been completed when the tank on the roof began to fill and resisted all Potts' efforts to turn off the water, and six hours' steady running very materially increased the damage. The plumber was then engaged regularly for three days in the week, and the adjoining house hired to be used for the storage of lead pipe, tools, etc., which were bought by the cargo. During the first week of the plumber's engagement every faucet in both houses began leaking badly, and all the basins were stopped up twice a day, and the third week Potts was compelled to put wire screens in all the windows of his bedrooms to prevent the occupants floating out during the night. In the midst of these entertainments the plumber reminded him that lead was rising, owing to so much being used for counterfeit money purposes. And three months from the time of the plumber's first appearance he owned and resided in the house, while Potts lived in the garret and worked as helper to him, half his wages each week being forfeited to pay off the balance of his bill. —*Detroit Free Press.*

PROGRESSIVE PLUMBERS.

There has been formed an association of master plumbers in this city, whose members are taking all possible means to improve themselves in the science and the art of their profession. They have already discovered that the world moves, and everything else with it, and that plumbing, if it wishes to avoid being ranked among the lost industries, must keep pace with all the others. They are making a study of sanitation in its broader phases, and applying its principles to their own handicraft. They are discovering that, because the "bosses" of whom they learned their trade did certain things in a certain way, it is no reason why the same things should continue to be done in the same manner.

The public will welcome these efforts at reform and advancement. There is no class of mechanics which has so much to do with the question of the health of a people as the plumbers. They are of more value to a community than the doctors, for the reason that they can prevent innumerable diseases, which is vastly more important than attempts at cure. With intelligent, scientific plumbing, one-half of all the difficult problems connected with sanitation will disappear.—*The Chicago Daily News.*

ON THE DRAUGHT OF CHIMNEYS.

The only cause of that upward movement which we call the draught of a chimney is the difference between the weight of the column of air and vapor in the shaft, and that of a column of equal height of the exterior atmosphere. This difference of weight must be enough to overcome the friction within the chimney shaft and any resistance to free discharge at the top. It is obvious that the ascending volume consists of matter which, at equal temperatures, is heavier than atmospheric air, as it contains soot, or finely comminuted carbon, carbonic acid, sulphur, and other matter naturally heavier than air. To increase the draught, we must increase either the height of the chimney, or the temperature of its contents. This explains at once the efficacy of the best appliances for increasing draught, such as the bi-valvular registers, in this country, and the iron blind that is drawn down within the chimney aperture in the wood-burning fire-places of France and of Belgium. The larger the aperture below—the greater the quantity of cool air that enters the chimney,—the lower is the temperature of the contents, and the less the draught. The more the air below is compelled to pass through in close proximity with the burning fuel, the higher does the temperature within become, and the more powerful the draught. This is the simple key to the whole theory and practice of draught produced by heat. Of course, in different conditions of the barometric column equal amounts of heat will have somewhat different effects. Hence we can see in a moment why our fires should "draw" so much better in clear cold weather than when the air is warm, or loaded with damp. The weight of a cubic foot of air at 32 degrees Fahrenheit is .08c,728 pounds avoirdupois. If the top of a chimney-flue were closed by a flap, or hinged valve (the weight of which we take as counterbalanced), the effect of the draught, or rather of the downward pressure of the external atmosphere which causes the upward draught, would be to lift the valve in proportion to the force of the current. If at the same time a strong wind be blowing over the top of the chimney (in the direction of the hinged end of the flap), its effect would be to force down and close the valve. The stronger current of the two will obtain the mastery, to the degree of its excess of pressure. This is also the effect, it will be seen, of a cross current where there is no valve, but where the currents more or less interfere with the movement of one another in the way shown by the action of the valve. It is possible wholly to eliminate the effects of the cross-current, and even to utilize it in aid of draught, by any contrivance that causes the external blast to produce an induced current from within the chimney.—*The Builder.*

ORIGIN OF THE ARCH AND VAULT.

When the early Egyptian, ten thousand years ago, wanted a more permanent habitation than the tent that had sheltered his wandering ancestors, he found at his command three substances—mud, reed and stone. With the last the kings and priests, who had great forces at their service, built pyramids and temples, and rich men constructed their dwellings in cities. But before that pitch of civilization there must have been a style of buildings which has continued by the side of the other in the dwellings of the fellahin down to this day, in which the first two materials are used together. A square hole dug in the ground is surmounted by four walls of mud and reeds, and a roof of cane covered by branches and grass, which is all that is needed in a rainless country. This is the simplest method that has survived to this day. But M. Daly (in a late number of his *Revue Générale d' Architecture*), with the eye of theory, looks back into what may be called a pre-antiquarian time, and sees there a missing link. There must have been, he thinks, a construction with the first material alone. The peasant formed a heap of sand as large as he wished his hut to be, threw over it a layer of tenacious Nile mud, and, when the mud was dry, pulled out the sand through an opening which became his doorway. Here was the first dome. If he wanted a large hut, as the mud dome was not strong enough to be made of very great diameter, he made it oblong; the larger the hut wanted, the longer it became. Here was the vault. When unbaked bricks were discovered, the vault was made of them, and in this form it is still to be seen in any Egyptian village; but the moulded house has centuries since gone out of use. The dome, the vault, and the arch (for the doorway was an arch) thus discovered at the very outset of building, instead of being, as has often been thought, the result of late conscious architectural thought, were used very sparingly in the stone architecture of the Egyptians. The priests avoided the arch in the temples, the rich used it rarely in their dwellings. It was left for the hut, the store-house and the tomb. For some reason or other the Egyptian regarded it with a distinct æsthetic aversion.—*The Nation.*

DEATHS FROM PREVENTABLE DISEASES.

The following statement shows the mortality in this city, for the weeks indicated, from the leading zymotic diseases, consumption and acute lung diseases:

Week ending—	Small Pox.	Measles.	Scarlet Fever.	Diphtheria.	Croup.	Typhoid Fever.	Cerebro Spinal Fever.	Malarial Fever.	Consumption.	Acute Lung Diseases.
January 13	5	----	8	17	8	5	4	2	21	27
January 20	---	----	9	21	6	8	3	1	27	24

CURRENT PUBLICATIONS.

HOUSE DRAINAGE AND SANITARY PLUMBING.

This little volume is one of Van Nostrand's science series. It was prepared originally for the annual report of the State Board of Health of Rhode Island by Wm. Paul Gerhard, Civil and Sanitary Engineer. It was written "both for professionals and laymen," and would be particularly valuable for the latter, if they have any interest in healthy homes. It is quite free from technicalities, relating in a plain and straightforward manner what is essential in a correct system of house drainage. There is nothing difficult to understand about sanitary plumbing and drainage, and there is no reason why every householder should not acquaint himself with the essentials. As Mr. Gerhard says "they involve nothing more than the proper application of well-known laws of nature; there is no mystery, no secrecy about any part of the work." It is just such little books as this of Mr. Gerhard's that will teach a man at least the essentials. After stating what the ends to be reached in a perfect system of house drainage are, he proceeds to a discussion of the position of drains and their material, holding, quite correctly, that they should be of iron and affixed to the wall of the basement rather than buried under ground, or at least made entirely accessible as in a trench, the sides of which are walled with brick work and the base of cement. The essentials of a system of plumbing mentioned are such as are generally recognized, and in some cities, as in Chicago, are required by law in all new buildings. The dampness of walls is an important matter to which only a few lines are devoted, although more might not be expected in a work on plumbing. The serious nature of this matter is indicated elsewhere in this number of THE SANITARY NEWS. It is not an uncommon practice, at least in this city, to build foundation walls in cheap houses of brick. Under the brick is a plank laid in a shallow trench. The result is that the basement is simply a reservoir for the water which soaks in from the surrounding soil, much or little according to the rainfall and consequent dampness of the earth. If the walls are properly cemented this can be largely prevented, but cementing is seldom thought of for a house to be rented. Mr. Gerhard's remedy is to have "a damp course" of some impervious material. "If at all practicable there should be a dry area all around the foundation walls in order to prevent any dampness in the walls originating from the earth surrounding it at the sides. If such an area can not be provided, a double wall with an air-space between inner and outer walls should be used." The author gets at the root of the whole matter of improved plumbing by stating that, in the case of new buildings, it should be shown by the architect's plans. "The work should be done according to written specifications, carefully drawn up by the architect or a sanitary engineer, under whose immediate direction the plumber should work." A prudent house-owner, he says, will prefer to have his plumbing done by day labor, by honest, conscientious plumbers—and these are by no means rare, as the universal cry against them would seem to indicate. The book is replete with practical information, further reference to which can not be made here for lack of space.

THE CONTINENT.

This new illustrated weekly magazine, conducted by Judge Tourgee, increases in interest with each succeeding number, and is certain to meet with great success in its competition with the old monthlies. The illustrations are numerous and creditable, the fiction of a high grade, and, what should be specially noticed here, the department of "The Household" has some very sensible articles on sanitary topics. It will not be long before the public will thirst after knowledge of this kind, and it will not be possible for the special journals to give them all they want and need.

THE AMERICAN ARCHITECT.

"The American Architect" has been conducting a competition among young architects for a design for a "dwelling-house whose cost shall approximate $3,000." This competition closed on January 13, and is said to have resulted most satisfactorily. A large number of the designs will be published in that journal during the year with full specifications, thus affording the public an opportunity of ascertaining what can be accomplished in house-building for a small amount of money. The design published in the last issue is a tasty one, and indicates that money can be saved by employing a good architect. Indeed, anyone who has built with an architect's assistance and again without it has learned that the architect's fee is saved many times over. As announced in the programme which the competitors were required to fill "the house is intended for a clerk who has a salary of $1,500, but whose social position is unexceptionable, and he consequently hopes to be able to build for the $3,000, which economy has placed at his command, a house in harmony with the tastes and habits formed during bachelorhood. He is now married and has two children who must be provided for in the planning, as also the maid-of-all-work."

THE MODERN AGE.

The second number of this new venture in the field of eclectic publications is even better than the first. Its selections are all more than readable and the editorial discussions of current topics worthy of the evidently capable writers at the head of the enterprise. Still better things are promised.

PERIODICALS RECEIVED.

"The Continent." The January numbers. Published weekly by "Our Continent Publishing Company" at Philadelphia, Subscription price $4.00 a year.

"The Medical Record." A weekly journal of medicine and surgery. The January numbers. Published by William Wood & Co., New York. Subscription price $5.00 a year.

"The New York Medical Journal." A weekly review of medicine. Published by D. Appleton & Co., New York. Subscription price $5.00 a year.

"The Manufacturer and Builder." Published monthly at No. 21 Park Row, New York. Subscription price $2.00 a year.

"The Sanitarian." January 11 and 18.

"The Modern Age." February.

"The Scientific American." January 6, 13 and 20.

"The American Architect." January 6, 13 and 20.

"The Cincinnati Lancet and Clinic." January 6, 13 and 20.

"The Medical and Surgical Reporter." January 6, 13 and 20.

"The American Engineer." January 5, 12 and 19.

"The Plumber's Trade Journal." January 15.

"The Mississippi Valley Medical Monthly." January.

"The Toledo Medical and Surgical Journal." January.

"The Literary News." January.

NOTES AND NEWS.

Health Commissioner DeWolf estimates the expenses of the Health Department of this city for the current year at $121,527.50, made up as follows: Commissioner of Health, $3,000; Secretary, 1,500; Registrar, $1,500; Clerk, $1,500; twenty sanitary policemen, at $900, $18,000; four medical inspectors, at $900, $3,600; five meat and stock-yard inspectors, at $1,000, $5,000; one chief tenement-house inspector, $1,500; five tenement-house and factory inspectors, at $1,000, $5,000; printing and stationery, $1,500; vaccine virus, $5,000; disinfectants, $1,000; incidentals, $500. It is estimated that the Small-pox Hospital can get along with $28,740. For scavenger service, $115,027.50 is wanted, because, "if the reasonable complaints of our citizens," as the doctor says, "regarding the imperfect performance of this service are to be heeded, a more liberal appropriation must be made." The cost of the removal of dead animals will be $6,500.

A servant girl in the family of Mr. Edward Burling, of 339 La Salle avenue, this city, was instantly killed last week by an explosion of the water-back in the kitchen stove. The water pipes had been frozen during the night and the girl started the fire in the morning wholly unconscious of this fact. The explosion threw a piece of iron from the stove against her head with sufficient force to fracture her skull. The warning of a similar explosion in the same house previously, seemed to have no effect on the servant in inducing precaution during such extremely cold weather as prevailed last week. It seems that she had been frequently told to keep the fire burning all night during the coldest weather, but she neglected to do so.

Among the papers left behind him by a German physician who died a few weeks ago is one containing notes of certain conclusions he had arrived at during a professional experience of more than forty years. In one of these notes he expresses an opinion that at least a third of the illnesses of the patients who sought his advice were purely imaginary. He found it not only against his own interest, but also against that of

the self-alleged sufferers, to destroy the illusion by informing them that there was really no cause for anxiety. Ill-health was to them a matter of almost vital importance. To destroy the pleasing belief that they possessed this blessing was an absolute cruelty.

The total estimate of the expenses of the Department of Public Works of this city this year amounts to $1,202,874.81. For miscellaneous sewerage construction there is needed $150,000, in addition to $63,000 to complete the West Twenty-second street sewer from its present terminus to its outfall, $14,000 to build the Indiana street sewer from Milwaukee avenue east to the North branch of the Chicago river, and $7,000 to complete the Waller street sewer from Thirty-first street to the South branch, etc., a total of $245,513. For sewerage maintenance there is wanted $94,266.66, and for the new City Hall, $90,718.73.

Owing to the recent floods in Scotland, the medical officer of health for Bristol condemned a large number of houses as unfit for habitation. The sanitary authority summoned the owners with a view to having the dwellings closed under the Public Health Act. The weight of the medical testimony was in favor of the prosecution, but the inhabitants declared that they had in no way suffered in health, and persons 70 years of age stated that, although continuing to live there, they were never better in their lives. The magistrates dismissed the summonses.

During the recent "cold snap," in which the thermometer indicated at one time 26 degrees below zero, ice was heaped up about the Chicago water-works crib fourteen feet high, but no serious trouble resulted from the freezing of pipes. The pumping-works were kept working at 90 per cent. of their full capacity. This was necessary, as one-fourth of the taps were left running to keep the pipes from freezing.

The annual report of the board of health of Augusta, Georgia shows, notwithstanding the increase of population of over one thousand souls during the past year, a decrease of ninety-three deaths from the report of the previous year, equivalent to about 12½ per cent. The decrease is noticeable particularly in malarial diseases.

An alarming outbreak of typhoid fever has occurred in the Newton Heath, a township within the Parliamentary borough of Manchester. At a special meeting of the Local Board for the district, one of the medical men reported that it was due to the opening of a defective sewer containing poisonous and infective material.

The total number of public street lamps in Chicago is 11,665. During the past year they were kept burning 2,553 hours. The cost of lighting the Washington and LaSalle street tunnels was $7,607.01. Gasoline lamps to the number of 2,065 are in use in the city, 1,377 of which were added last year.

It is said that 10 per cent. of the deaths in Philadelphia last year were caused, or aggravated, by bad sanitary arrangements, and it is stated that ten thousand cases of sickness annually might be prevented if the authorities and the people would unite in keeping the streets aud houses clean.

The master plumbers at Milwaukee are considering the advisability of organizing an association in that city. They could not do a better thing for themselves and the public. There is no doubt that they would receive encouragement and assistance from their brethren in Chicago.

Col. George E. Waring, Jr., of Newport, R. I., is engaged as consulting engineer in preparing specifications for the great intercepting sewer about to be constructed in Buffalo. This sewer will cost not less than $700,000, and it will take two years to complete it.

The Cook County Tramway Company has been organized and incorporated by Michael Weber, Coddington Billings, John V. LeMoyne, John L. Stockton and William R. Page. Its purpose is to build street railways in Lake View and adjacent towns.

The Commissioner of Public Works, Chicago, has awarded the contract for building the bridge at Ashland avenue over the South branch of the river to the Detroit Bridge and Iron Works at a cost of $10,500. The bridge will be constructed of iron.

The Western Edison Electric Light Company has offered to place an Edison dynamo-electric machine in the new City Hall, furnishing 250 lights in that building and 150 in the Washington and LaSalle street tunnels one year for $9,183.

The Bain Electric Light Company, of Chicago, with a capital stock of $500,000, has been incorported. The incorporators are Force Bain, William H. French and Alexander S. Lieb.

The amount required for street improvements to be made in this city during 1883, already ordered by the city council, will be $400,000

An ordinance to improve the lighting of the streets of the city of Dayton, Ohio, has passed a first reading.

BUILDING INTELLIGENCE.

The vacant corner at the intersection of Monroe and Dearborn streets is to be improved at last by the erection of an imposing structure in red brick, terra cotta and tile, the whole fire-proof. The building will be erected by the company owning the stock of the Commercial National bank. The Brooks estate will also build an imposing structure just south of this, fronting on Dearborn street, 100x131 feet in size. This will be six stories high. The two buildings will cost about $600,000.

The Commissioner of Health and the Commissioner of Public Works have at last been instructed to prepare plans and select a site for a morgue in this city. These officials will visit other cities and get the benefit of their experience. The unknown dead in Chicago have been treated with disrespect long enough, their bodies having been thrown into a miserable building, uncared for and food for rats.

The flooring and fire-proof roofing of the new city hall have been completed, and the Superintendent of Buildings has issued an estimate for $10,000 to Johnson & Co., remaining due on their contract. The original contract price was $54,149, but the cost was afterward increased to $61,480 by a change in the specifications.

Henry F. Starbuck is architect for a new house to be built for Charles Nimrod, executor of the Nimrod estate, on Belden avenue near Clark street. The building will be constructed of pressed brick with terra cotta trimmings, and will cost $7,000.

Building operations have been considerably delayed by the high price which has been placed upon brick and other material. The building of many flats and stores which were in prospect last year have been abandoned, it is said, on this account.

The lowest bidder for the erection of three police patrol houses is George C. Bodmer, as follows: East Chicago Avenue station, $1,382; West Chicago Avenue station, $1,260; North Avenue and Milwaukee Avenue station, $2,498; total, $5,140.

Mr. J. C. Cochrane, architect, of this city, has just completed the plans for a new court-house to be built at Valparaiso, Indiana, to cost $100,000. The size will be 80x108 feet. The walls will be built of pressed brick with stone trimmings.

L. D. Grosvenor, architect, of Jackson, Michigan, is said to be preparing plans for a large hotel to be built the coming summer at Lansing, that State, by Hon. O. M. Barnes.

An estimate of $5,259.30 has been received from E. F. Gobel for constructing buildings at the Bridgeport Chicago pumping-works.

BUILDING PERMITS.

The following is a list of all new buildings in Chicago for which permits have been granted during the past two weeks, giving location, size, cost and name of owner. All buildings are of brick unless otherwise specified:

Irving pl. near Adams st., 2-story flats, 66x50, $9,000; Arnold Bros.
153 S. Sangamon st., 2-story dwelling, 21x38, $5,500; P. J. Ryan.
118 Forquer st., 2-story flats, 21x44, $3,000; Frank Nowak.
3801 Butterfield st., 2-story flats, 22x54, $2,200; M. McCarthy.
Noble st near Blackhawk, 1-story cottage, 20x20, $400. P. Louchansk.
3218 Butterfield st., basement, 21x45, $[illegible],000; J. J. Powers.
Winchester and Van Buren sts., 3-story flats, 50x55, $10,000; William Mara.
650 Noble st., 2 story dwelling, 20x42, $1,200; John Boni.
Superior st. near Rockwell, 2-story flats, 21x42, $2,500. T. C. Goudie.
486 Lincoln st., store, 2cx50, $1,5[illegible]0; William Rersiner.
38 Rees st., 1-story store, 20x50 $1 000; F. Heinburg.
Emerald ave., near Thirty-first, 1-story cottage, 20x32, $1,000; Albert Crane.
267 Rumsey st., 1-story cottage, 20x50, $1,000; F. J. Groh.
191 Blackhawk st., basement, 20x23, $7[illegible]0, John Peterson.
165 Kasson st., 1-story cottage 20x28, $800; A. Gresminn.
602 Holt st., 1-story cottage, 20x20, $500; Frank Domba.
Division and Clark sts., 3-story office building, 54x125, $25,000; Chicago North Division R'y. Co.
363 Division st., change factory to flats, 65x25, $2,000; W. & E. Batcheller.
227 and 229 Michigan st., additional story, 50x100, $2.000; Charles Mears.
Ohio and Union sts., 2-story office and barn, 40x96, $8,000; Schlitz Brewing Co.

The Sanitary News.

Vol. I. Chicago, February 15, 1883. No. 8.

CONTENTS.

CURRENT TOPICS:
- Causes of Mortality in Chicago ... 85
- Proposed Plumbing Ordinance in Philadelphia ... 85
- Grand Jury and County Commissioners ... 85
- How to Prevent Water-Back Explosions ... 86
- Creditable to the Master Plumbers ... 86
- Undue Alarm About Water-Waste ... 86
- A Water Tax Which Should Be Removed ... 86
- Alleged Adulteration of Coffee ... 87
- The Manufacture of Water Gas in Chicago ... 87
- Sewer Gas and a Suit for Damages ... 87
- Epidemic of Enteric Fever and Its Cause ... 87

HOUSE DRAINAGE AS IT IS. II ... 88

HOW TO MAKE A PLACE UNHEALTHY. By O. W. Wight, Health Officer of Detroit ... 89

POPULAR ERRORS ABOUT MEDICINE. By John Avery, M. D., Member Michigan State Board of Health. I ... 90

THE HOUSE INTERIOR ... 92

A NEW YORK TENEMENT HOUSE ... 93

THE MASTER PLUMBERS ... 93

DEATHS FROM PREVENTABLE DISEASES ... 93

AMONG THE TENEMENTS ... 93

CURRENT PUBLICATIONS ... 94

NOTES AND NEWS ... 94

BUILDING INTELLIGENCE ... 95

THE total mortality in Chicago for the month of January was 966, only 34 greater than during the same month of 1882. In 1881, it was 1,178, and 976 in 1880. The annual death rate was 20.67. The deaths from zymotic diseases last month numbered 256; from consumption, 99, and from acute lung diseases, 141. Of the entire number of deaths 428 were of children under five years of age, and 250 were under one year. The highest death-rate was in the Third ward, where there are good houses, but much defective plumbing. The lowest death-rate was in the Ninth ward, but 40 per cent. of the deaths were caused by zymotic diseases. There is not overcrowding in this ward, but, as in the Sixteenth, where the per cent. of deaths from zymotic diseases reached 42, the houses are frame and usually supplied with a death-trap in the nature of a kitchen sink which discharges into a foul grease-basin, or privy-vault, through an untrapped waste-pipe. The mortality from zymotic diseases was lowest in the Eighteenth ward—just 20—where the residences are, as a whole, the best in the city, and the plumbing, without doubt, in the best condition; that is, the houses have been more recently built and drains are better ventilated, the joints in more perfect condition, better traps are used, etc. The mortality among children under five years of age was greatest in the Fourteenth ward, being considerably more than half the entire deaths in the ward. This ward is one of those in which there is great overcrowding among those who live in tenement houses. Foul air and exposure seem to have been the destructive agents. The same causes operated to increase the mortality among those affected with lung troubles, as the proportion of deaths from consumption and acute lung diseases was greatest in the Fifth and Fourteen wards. Consumption excepted, diphtheria caused the greatest number of deaths in the entire city, the number reaching 73. There were 13 deaths from small-pox.

THE city of Philadelphia has under consideration a proposed ordinance regulating the drainage and plumbing of buildings and the registration of plumbers. Two drafts are before a committee of twenty-one, consisting of seven plumbers, seven architects and seven physicians and citizens, who have yet to pass upon them. One provides that the drainage of all buildings, hereafter erected in the city, and their plumbing and ventilation, shall be executed in accordance with plans approved by the Chief Engineer and Surveyor. House drains must be independent and made of iron and trapped, with an inlet for fresh air just inside the trap. Every soil-pipe and waste-pipe must be of iron and extended full size to and above the roof, and every drain, soil-pipe and waste-pipe, and their traps must be exposed to view, or at least not be inaccessible. It is provided that every water-closet, sink-basin, waste-tray, bath, and every tub or set of tubs shall be separately and effectively trapped as close to the fixture as possible, and the traps protected against siphonage by special metallic air-pipes. It is finally provided that every master or journeyman plumber shall register his name at the Department of Surveys. The second draft, made by Dallas Sanders, provides that all drains and soil-pipes shall be of iron, "or other metal," and securely "ironed to walls"; when it is impracticable to do the latter, the pipes may be laid in trenches of uniform grade, or suspended to floor timbers by strong iron hangers. No brick, sheet-metal, or earthenware flue shall be used for a sewer, soil or waste-pipe ventilator, nor shall any chimney flue be used for such purposes. All iron pipes are to be coated inside and out with coal-tar pitch, or some equivalent substance. There are other important provisions, but enough have been given to show that "the world moves" in this matter of house drainage. The day may not be far distant when all cities will wake from their lethargy and fall into line.

BY continued agitation of the question it is possible that the drainage and ventilation of the Cook County Jail and Criminal Court Building may sometime be put into proper condition. Although not indicting any body for criminal negligence, the last grand jury intimated that one or more of the County Commissioners ought to be. The jurors said that they found "the report of the November grand jury fully justified, and the buildings in such a sanitary condition as would warrant any Board of Health in promptly closing them. We also find," the report continues, "that the Board of County Commissioners ordered a

competent architect (Mr. J. R. Willett) in November last to make a thorough examination of the system of sewerage, plumbing, and ventilation of these buildings, and to report a plan whereby any of the existing evils could be remedied; but in consequence of a change in a portion of the Board a new Committee on Jail and Criminal Court building was appointed, and County Commissioner Albright, the new Chairman of such committee, on his own responsibility dismissed Architect Willett, by reason of which nothing has yet been done. For this culpable negligence and delay the valuable lives of those who administer justice, as well as the employés of the county and citizens whose duty compels their attendance upon the Criminal Court, were placed in jeopardy. We believe from the evidence that Commissioner Albright is very largely responsible. But the entire Board must share to some extent the blame with him. The grand jury are informed that action has lately been taken by the County Board which, if not again interfered with, may attain good results, in view of which we have only to add that we must characterize this neglect and delay in so important a matter as that of willful or careless inhumanity, which is morally criminal."

At the last meeting of the Master Plumbers' Association a committee was appointed to prepare a paper on kitchen-stove water-backs and the best means of preventing explosions in them. The committee prepared the following: "A cast-iron water-back is known by all practical plumbers to be the most dangerous. When an explosion occurs it flies all to pieces, carrying destruction and death with it, while on the contrary, we know of no fatal results by the bursting of wrought-iron pipe water-backs. To prevent water-back explosions, before you light the fire in the morning in your kitchen stove, apply a burning newspaper to every part of the connecting pipe between stove and boiler. Hold the blaze longer close to the boiler and stove. Repeat this several times. A spirit lamp or hot water will serve the same purpose as burning a newspaper. As a simple indicator place an open vessel of water as near the pipe connection of the water-back as possible; if ice forms in the vessel during the night do not start a fire in the kitchen stove until you apply one of the above remedies. In cold weather if you keep a fire burning in the kitchen stove day and night this will insure you against any danger from water-back explosions."

The Master Plumbers are to be heartily commended for the interest which they have thus shown in instructing the public in such a simple, yet highly important matter. The more their patrons know about hot-water tanks, water-backs, service-pipes, waste-pipes, soil-pipes, etc., the better it will be for the plumbers. The superstitious dread of a plumber's presence and the everlasting growling about his bills are due to the lamentable ignorance on the part of householders of his work. It is natural enough for those whose sense of fairness is already blunted by prejudice,to charge the explosion of a water-back to the bad work of a plumber if they never knew what the real cause was. So it is with other parts of the plumber's work, defects or breakages in which should no more be charged to him than to the house-occupier himself. It is simple truth that plumbers are, day after day, directed by architects and builders to do defective work; if they protest they lose a job. A conscientious plumber said a few days ago that he was now entirely ignored by many architects when jobs were to be figured on, simply because he had refused to do work according to specifications which called for defective construction. The Master Plumber's Association can do very much toward educating the people to an appreciation of good work, and in explaining to them the simple facts about it. Their words will have the stamp of authority and will be listened to. In return for this the public ought to encourage the Association in its most commendable efforts to improve itself by establishing a library and reading room, and in weeding out disreputable employés who pass around from one shop to another, doing imperfect work.

Now and then great complaint is made about the so-called waste of water. The matter has been considered of so great importance that a Cincinnati genius has invented an apparatus for the prevention of "water-waste,"—that is, he is enabled at dead of night to determine through what service-pipes water is running, and, on the following day, the house occupant is supposed to be brought before a court to answer for his crime. To bring the people of New York to a realizing sense of the extent of the "water waste," as is stated by a member of the Taxpayers' Central Committee, who made a critical examination of the water-course, "the water was run to waste systematically by the authorities in charge, who even retarded the flow in the aqueduct by artificial means, for the purpose of creating a pretended scarcity." It is not to be denied that there may be some reason for precaution in a city where the supply is limited, but, so long as water is plenty, it is not wasted when discharged into the sewers. An unlimited supply of water lies at the feet of Chicago, to be had for the taking; any hindrance to its free use ought to be removed. The expense of pumping a few extra million gallons is a small outlay for the better cleaning of the sewers. During the two days of extreme cold weather on January 23 and 24, this year, when the thermometer ranged 14 degrees below zero, the pumping of sixteen million gallons more than usual saved, it may be, thousands of dollars in repairs of service-pipes, which would certainly have frozen and burst had the water not been left running night and day. Of course, attention should be given to the systematic use of water, and extravagance prevented. It is not right, in a sanitary sense, to inflict upon the people any regulations whereby as little water as possible shall be used; they should be encouraged, at least in Chicago, to use it liberally, just as a man should be advised to bathe in a bath-tub filled with water, and often too, although he might "get along" with a basin and a sponge, used once a week.

General Lieb, Superintendent of the Water Department, will call attention, in his forthcoming annual report, to a matter of importance in this connection. Under the present rules, out-houses which have connection with the sewers and which receive waste water from the house, are assessed by his department $3 a year, the same that indoor water-closets are, which receive water fresh from the street mains rather than the kitchen sinks. The argument used

is that the occupant might let the water run continuously from the faucet over his kitchen sink, and thence through the waste-pipe to the privy-vault to keep it clean. The General says it has come to his knowledge that many have actually diverted the course of the waste water from their kitchens, running it directly to the sewer, to avoid payment of the tax. The result is a nuisance in the rear of the house of the worst kind, not only to the occupant but to all his neighbors. The Superintendent further says: "It appears to me that it is rather straining the taxing power to charge a person once for the use of water and once again after using it. Instead of furnishing an incentive to parties to disconnect the waste-water pipe from the privy-vault, they should be compelled by the Commissioner of Health to establish a connection as a sanitary measure." He therefore will recommend that privies not connected with the water system directly be released from assessment.

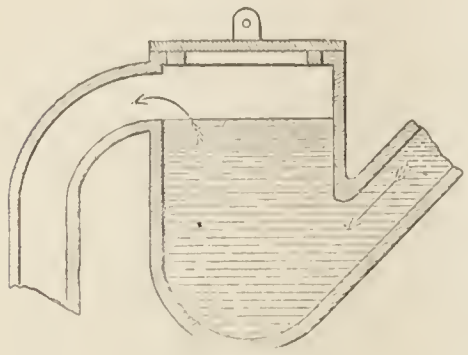
To "get even" with two enterprising Germans who are said to owe a balance on the rent of an old barn, a South-side physician has been endeavoring to create a sensation over an alleged adulteration of coffee by the former. He claims that the Schmidt Brothers have been guilty of manipulating green and inferior coffee, on quite an extensive scale, until it assumed the appearance of good Java. It is claimed that they prepared coffee in this way for a number of South Water street merchants, who have, presumably, sold it to retail dealers in the city and out of it, somebody thus making a handsome profit. So far as appears at present nothing more had been done with the coffee than to subject it to a sweating process which resulted in increasing the size of the berry and giving it a brown color—"aging" it, as it is called. It is claimed that the manipulators used a coloring material, but the Schmidt Brothers deny this, although they acknowledge the rest of the business, insisting that they have been doing nothing fraudulent, nor unusual. The fact remains that the consumer suffers fraud at somebody's hands, since it is almost impossible to buy coffee at the retail stores which is fit to drink. If nothing more is done with it than the "aging," the natural oil is undoubtedly driven out and coffee which was poor in the beginning is simply made worse, although changed for the better in appearance. As to the coloring matter, if used at all, it is not likely that it is injurious. With "aged" coffee and butterine put upon the market and sold as genuine, the chances of getting the genuine article are slim. Adulterated beef and potatoes may be looked for next. Indeed, a new use is said to have been found for potatoes, though not for food. It is said that they are converted into a substance resembling celluloid by peeling them, and after soaking in water, impregnating them with sulphuric acid, drying and pressing between sheets of blotting paper. In France, pipes are made of this substance, said to rival meerschaum in appearance. By subjecting the mass to great pressure billiard balls can be made of it, rivalling ivory in hardness. If poor coffee could be petrified by some rapid process, and used by roofers, for example, nobody would object. The city authorities have not been asked to investigate the doings of the Schmidt Brothers and probably will not be, although the chemist of the Health Department is ready to make any analysis.

APROPOS of the discussion of the future of water gas by Prof. C. V. Marx in the last number of THE SANITARY NEWS, is the information that its manufacture has been undertaken in this city. The promise of its successful introduction as an illuminating and heating agent, supplanting the common coal gas, seems about to be realized. The origin of the project here was the taking out of a patent in 1881, by T. G. Springer for an automatic machine for supplying light to single blocks, or large, isolated buildings. The gas is manufactured by passing steam over, or through, burning coal, by which it is decomposed. When it is to be used for illuminating purposes, it is charged with petroleum. The cost of manufacturing is said to be very much less than by the old process. The average production under the old system is ten thousand cubic feet per ton of coal; under the new, forty to fifty thousand cubic feet. While the former utilizes only about 20 per cent. of the heat in coal, the latter will save 90 per cent. All this has been proved by the People's Gas Company, which expects soon to introduce its new product into private houses and manufactories, both for heating and lighting purposes. As to the cost, it is stated that the gas can be furnished as cheap as petroleum. The advantages to be derived in the way of cleanliness and convenience by the use of gas stoves, instead of coal stoves, can hardly be appreciated until they are actually a reality.

ALLEGED defective drainage in the house at No. 474 West Randolph street, this city, has led to an action at law. Mrs. Georgiana Pierce rented the premises for the purpose of keeping a boarding-house. She claims that the agent represented the house to be in good sanitary condition, and she moved in on May 19, 1882. She soon found that the drainage was so defective that the waste of the house accumulated under it rather than flowed to the street sewer. In consequence, as she claims, members of her family were prostrated with sickness, due to the breathing of the foul gases, and her boarders left her. As her business was broken up she holds that she has sustained damages in the sum of $10,000, and she brings suit before Judge Anthony in the circuit court to recover that amount. The case is being watched with considerable interest. The owner of the property and the agents are contesting with vigor.

DURING the four months from June to September, inclusive, last year, there were more than 550 cases of enteric fever at Bangor, England, and in its immediate neighborhood. The outbreak was one of the most severe which has been recorded in that country for many years. A searching inquiry, according to *The Lancet*, was made by Dr. Fred W. Barry, Medical Inspector to the local Government Board, and it was proved that the outbreak had in the first instance been brought about by the contamination of the water service, into which the specifically-poisoned excreta of an insolated case had been conveyed by faulty means of drainage, and that its extension was in the main the result of an ill-ventilated system of sewers which facilitated the entrance of the fever-poisoned drain air into dwellings.

DIPHTHERIA was less prevalent in Michigan during the past month than in January, 1882.



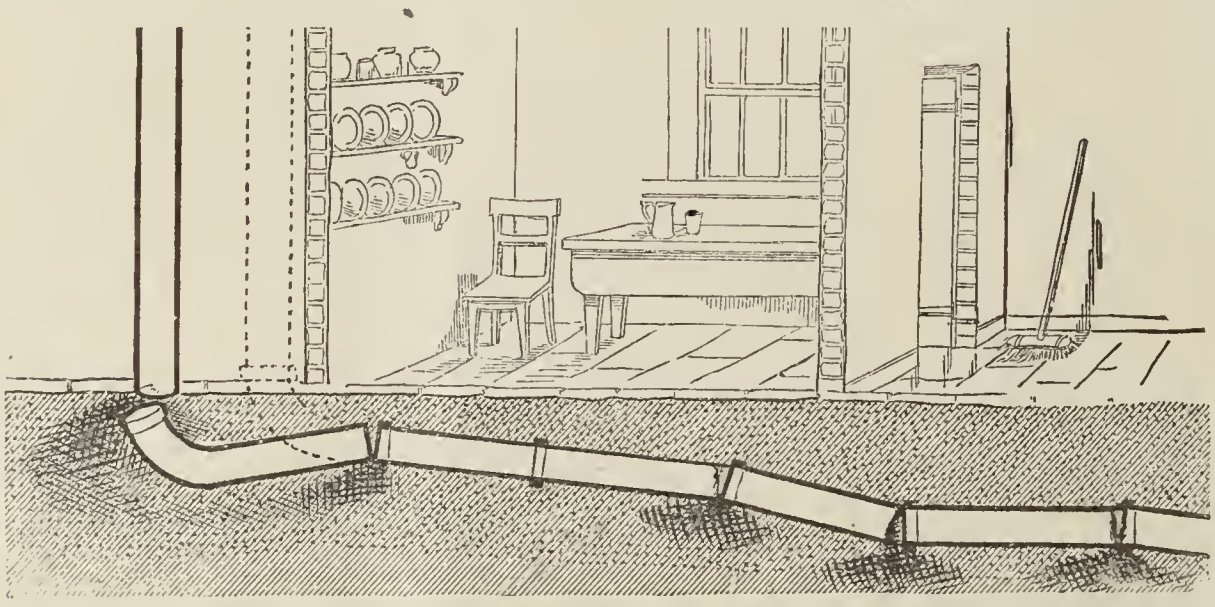
ROUND TRAP.

HOUSE DRAINAGE AS IT IS.

II.

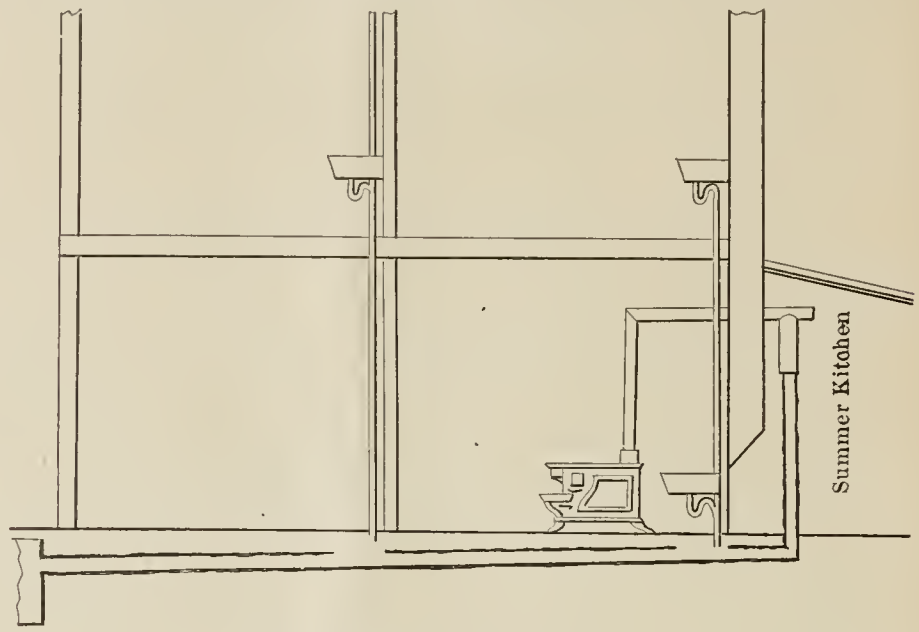
It is the object of the few articles which will appear under this head to give such facts about existing house drainage as will prepare a man to make a preliminary examination of his own premises or any which he may wish to occupy. If he cannot satisfy himself, after such examination, that the drainage is in proper condition, then he can appeal to a higher authority. He who sends for a physician whenever he has the headache, or bruises his finger, acts foolishly; so too, he who pens a note to the Health Department as soon as an unusual odor is noticed in his house. Just as a man knows that a headache may be prevented by keeping his digestion good, and a bruised finger cured by the application of a poultice, so he should know that unpleasant odors may come from dead rats and decaying vegetables, whose prompt removal from the premises will end the nuisance. Not all foul odors come from sewers and drains; hence, so-called sanitary experts should not be hastily summoned and set to work tearing up floors and digging up drains. House drainage should be placed on the same footing that architecture, and building, and decorating, and furnishing are. There is no mystery about it, and the mastery of the details of construction is no more necessary to the house-holder than that of the mathematics of engineering, so necessary to the architect.

The illustration given below shows the possible condition of drains that have been imperfectly laid, or when the material itself has been defective. It is a common practice of drain-layers to cover with earth each section of drain-pipe as it is laid, before the cement has hardened, the narrow trench in which it is laid having been unevenly excavated, and the bottom thus inclining at this and that angle. The result is what is indicated in the illustration,—unequal pressure and uneven settling, disconnected joints and broken pipes. The effect may be somewhat exaggerated, but the result is the same if there is only the slightest opening,—the sewage runs out and, little or much, in time saturates the soil.



BROKEN DRAINS.

This drain may be found to consist of boards, which cannot be made tight, and which soon rot away. An example of such a contrivance was found by the Inspectors of the Health Department only a few days ago, on North Franklin street, an illustration of which is given below. The drain had so decayed that it had almost collapsed, and the ground was saturated with sewage. The house was originally a two-story frame, but when the street was improved a few years ago it was raised and a brick basement built under it. The builder had evidently heard something about ventilating drains, so he attempted to utilize the modern idea by extending a wooden shaft upward at the upper end of the drain some five or six feet. He then set a piece of

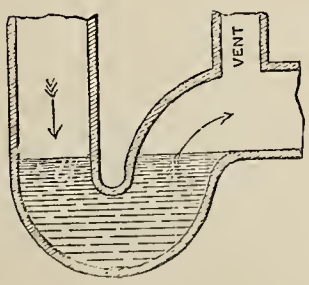


DEFECTS OF CONSTRUCTION.

stove-pipe over the end and by the use of an elbow connected it with the chimney, as shown. Directly opposite this ventilating apparatus was the pipe from the kitchen stove. So long as fire was burning in the stove the foul air from the drain might have been carried out above the roof; when the fire was not burning it might have been drawn directly into the rooms, or blown in by down-draughts in the chimney, not an uncommon occurrence as everybody knows. Under no circumstances should a drain be ventilated directly into the chimney; a separate flue, adjoining, or within the chimney, should be constructed for this purpose.

But there were other defects in the drainage of this Franklin street house. When the building was raised the waste-pipes had to be lengthened. In one instance, as indicated, the waste-pipe was too short; it did not reach down within eighteen inches of the drain, and it was never connected. The plumber may have been directed by the owner to leave it unconnected, to save the expense of additional pipe; the plumber may have willfully neglected to complete his work. Fortunately, it may be, the opening in in the wooden drain below was so large that most of the sewage found its way into the drain. An imperfect connection was also found at the bottom of the waste-pipe leading down from another sink. Some attempt had evidently been made to use cement, but there were only traces of it left.

Inspector Genung, Superintendent of the Inspection Service, was summoned to a house only last week, whose drainage was supposed to be in excellent condition, but in which there had been noticed, since the extreme cold weather of the past few weeks set in, peculiar and offensive odors. He found that the soil-pipe, which had been extended to and above the roof, had been completely closed at the top by the ice which had been formed from the vapor ascending from the drains. Further examination showed that the cemented joint at the foot of the soil-pipe, at its connection with the drain, was imperfect, and that the poisonous gases of the drain had been drawn upward within the box-covering of the soil-pipe to the second floor, their escape through the extended soil-pipe being prevented by the ice already spoken of. Still again, direct communication with the drain was established from the vegetable store-room in the cellar, by an outlet through the floor, evidently to provide an escape for water which might be used for cleaning purposes. So long as the extended soil-pipe was unobstructed the rooms of the cellar were well-ventilated through the openings described, to and through the drain and soil-pipe. Sadly enough, a little child eight months old, before as healthy as any child could be, was found at the point of death from diphtheria, apparently supporting the well-established belief among many of the best physicians and sanitarians that what is known as sewer-gas is a cause of diphtheria. Careful investigation resulted in finding no communication of the disease in this case by contagion and there had been no sickness of any kind whatever in the house, before this case, since the house was built. The soil-pipe, when extended above the roof, is usually surmounted by a hood, or is itself bent downward, to prevent the entrance of rain or snow and down-draughts. In the case under consideration the hood had blown off. If the pipe is bent downward the condensed vapor dripping from the open end has been known to freeze until the pipe was entirely obstructed.



P TRAP.

HOW TO MAKE A PLACE UNHEALTHY.*

BY O. W. WIGHT, M. D.,

HEALTH OFFICER OF DETROIT.

In the first place, no means should be used to prevent the spread of contagious, infectious and pestilential diseases. If you have small-pox in the house carefully conceal it. If it were known to exist there, especially if you keep a grocery, a meat-market or a saloon, and live in the same building, it might hurt your business. If your family doctor calls it small-pox, look daggers at him, and suggest that his services are no longer needed. Threaten him with all the calamities of your unbridled displeasure if he dares to report, especially to the diabolical Board of Health, that there is a case of small-pox in your household. Let everybody come in and see what is the matter. If the health officer comes around to interfere threaten him with a mob. The faithful in the neighborhood can help on the good cause by visiting the sick and denouncing the doctor. If any movement is made to prevent the spread of the disease by vaccination, the town board or common council has a fine opportunity of showing its appreciation of public economy by refusing to make an appropriation of the taxpayers' money for any such purpose, and if the Anti-vaccination Society sends you a tract, read it carefully and swallow its nonsense as gospel. In due time the loathsome disease will break out all around you in the neighborhood, and will be multiplied in your own family. Then denounce the public authorities for neglecting to protect the people. If your poor boy dies, insist on having a public funeral, and bitterly complain of your neighbors for not turning out better on such a solemn and improving occasion. When the business of the place has been ruined for several months, when 30 per cent. of the young people have been disfigured for life, when a score or two of new-made graves have been filled, then discourse in a lachrymose way about the dispensations of Providence. When the public authorities have been obliged to spend several thousand dollars to arrest a disease that might have been stopped in the beginning at a very small cost, then curse the assessor and refuse to pay your taxes. At least a great triumph of personal liberty has been achieved, by thwarting the health authorities in any despotic attempt to isolate the first case by removing it to the pest-house or announcing its existence by a placard on your dwelling. And the opportunities of improving the occasion have not yet been exhausted. Sanitary total depravity may be still further practiced by sending your infected carpets and furniture to some second-hand dealer in the city, where an unsuspecting purchaser may have a chance to communicate the disease to his family or friends, thus establishing a new focus for the pestilence. Finally, it is not worth while to miss the opportunity to discredit the sanitarian, by industriously proclaiming that such spread of contagion proves conclusively that his theoretical methods of arresting it are wholly impracticable and useless.

Other contagious diseases afford a still more fruitful field than small-pox for the ignorant, superstitious or perverse practice of sanitary total depravity. Scarlatina and diphtheria kill a great many more than small-pox. By all means, if you have scarlet fever or diphtheria in the house, send the other children to school, where, by means of the disease germs in their clothes, they can infect by wholesale. If a child dies, let all its school-mates come and see the corpse after it is laid out. The funeral should certainly be held in the church. Open the coffin in the close warm atmosphere, and let everybody have a last look at the infected remains. If the minister hesitates at all in laying the death directly to God, especially if he in any way suggests that you have a hand in it, then do not scruple to come to the conclusion that the minister is too wise to live long—in that parish. The pale lips, the marble brow, the bloodless hands folded over the motionless breast of the little one all plead to Heaven to shield other innocents from the slaughter of your stupidity, but still your misgivings and go on with the courage of fools in your unsanitary work. These dear little corpses look so sweet it would be a sin against hygenic total depravity not to multiply them. Should the impudent sanitarian even undertake to preach to you about the wisdom and justice of placarding your house and isolating those who are sick with these infectious diseases

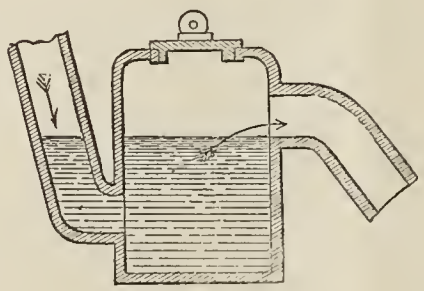
*Abstract of a paper read before a Sanitary Convention, held at Pontiac, Michigan, February 1.

for the purpose of protecting others, then denounce him for interfering with the decrees of Providence and resent his attempt to restrict your right to disseminate contagion. Should he propose to stop public funerals in cases of infectious maladies, then visit him with measureless maledictions for endeavoring to deprive people of the sacred privilege of Christian burial.

In the second place, conditions of filth abound everywhere, which may be utilized for the purpose of making a place unhealthy. All households furnish organic refuse in great abundance, which it requires no effort, nor even intelligence, so to dispose of as to produce the maximum amount of health destroying poisons. Fortunately, in resisting the encroachments of sanitarians, it is a good deal easier, and much more in accordance with the inclinations of human laziness, to leave decaying vegetables in the cellar all summer, than to remove them to a distant compost heap. The cellar windows should be closed to keep out wind, rain and cold. This valuable source of making your habitation unhealthy may be increased by neglecting to drain the site. If the cellar occasionally half fills with water, in a season of rain, the rotting potatoes, turnips and cabbage float around in it, especially if you have to wade in to get at the butter tub, milk pans and pork barrel, the means of unhealthiness will be greatly improved, although not yet perfected. If you live in town you can have a big, untrapped wooden box, or porous cement pipe, running from six to eight inches above the bottom of the cellar to an unclean brick sewer in the street, through which great volumes of putrefactive gas, laden with invisible vermin called bacteria, perhaps with the germs of contagious disease from neighboring premises, can freely enter, there to mingle with the malaria already formed, and flow up through all the living rooms of your habitation. In the winter bank up your house, and allow no portion of the foul gas to escape into the outer air, or any pure air from without to get in. Manure is a good material for such a purpose. The fires started when the cold weather comes will make the house itself act as a funnel to draw upward the poisonous exhalations from the bottom. Only one thing more is wanting to make the arrangement complete; if you live in town, you can have an unventilated water-closet, in some dark, interior part of the house, with imperfectly jointed or cracked soil-pipe, the sulphuretted and carburetted hydrogen gas from which will give a finishing flavor to the atmosphere of your dwelling.

Having thus secured the air best adapted to make your home unhealthy, you should also provide an abundance of commendably unwholesome water. The task is not a difficult one; it requires no scientific knowledge and not an unusual amount of intellect. If you live in a city, be sure and help elect officers who will take the public water supply from a source near by, and probably polluted with sewage, in order to save a little expense. If you live in the country, you can make a group of the barn-yard, hog-pen, dog-kennel and back-house, with the well in the center. Never remove the manure from the outhouses. Dig a great hole in the ground for the privy vault, and in it treasure up the vilest excreta for years. If the vault at length becomes full, throw a little dirt over it and dig another hole. Through the porous earth the putrescent mass will slowly drain to the well, in which hangs the "old oaken bucket." In Northern Scotland, as late as the sixteenth century, the people would dig up a corpse, cut off the head, soak it in a bucket of water, and then drink the water as a cure for witchcraft. They called it a "dead bree." You have provided a still more potent "dead bree" in the water of your well. Several tons of foul, putrid excrement, near by it, may safely be regarded as more poisonous than a whole graveyard full of corpses. The adjacent heaps of the excreta of cattle, swine and dogs, are not of equal unsanitary value, but they are effective adjuvants. Use the water long enough and it will cure you and your household not only of witchcraft, but of all other mundane ills. If the sanitary busybody says anything about your fine well, show him the clear, cold, sparkling water, and laugh at his moonshine about chemistry and the microscope. Remind him scornfully that the evidence of your unaided senses is better than all his new-fangled science.

Many an unfortunate man weaves about himself and his household, through his own sanitary ignorance, not unfrequently with the concurrence of another's sanitary crime, a fate more terrible than that recounted by the shade of Ugolino to Dante in the Inferno. I have no disposition to pronounce a malediction upon my fellow-men; but, within my own knowledge, more than one poor household has perished as pitiably, not with hunger, but with fever, for which a hard, indifferent, avaricious landlord, who could not be made to answer at the bar of sanitary justice, shall answer in the great hereafter. What the finger of retribution has written on the forehead of the offender cannot be erased by the blasphemous and essentially mendacious cry, "Am I my brother's keeper?" And he who, by his sanitary stupidity and obduracy, drags down to untimely sepulture with himself, his wife and little ones, shall not be allowed to plead ignorance of nature's inexorable law, before a Judge who endowed him with the powers of knowing, understanding and obeying.



BOTTLE TRAP.

POPULAR ERRORS ABOUT MEDICINE.*

BY JOHN AVERY, M. D.,

MEMBER OF THE MICHIGAN STATE BOARD OF HEALTH.

FROM THE TEXT:—"O Virgin, the daughter of Egypt; in vain shalt thou use many medicines."

I.

When Jeremiah, the prophet, spake these words to Baruch, he uttered a truth applicable to all times, as well as a prophecy. Looking forward across twenty-five centuries, there fell upon his vision nations of medicine-hunters, medicine-compounders and medicine-takers, and he saw a danger greater than the hosts of Pharaoh threatening the lives of the children of Israel, and raised his prophetic voice against it. He saw in this country alone an army of seventy-five thousand physicians toiling up from the great laboratories of the medicine-makers, each laden with more than ten thousand drugs in their different preparations and combinations, and making ready to offer their services and

*Paper read before a sanitary convention held at Pontiac, Michigan, February 1, 1883.

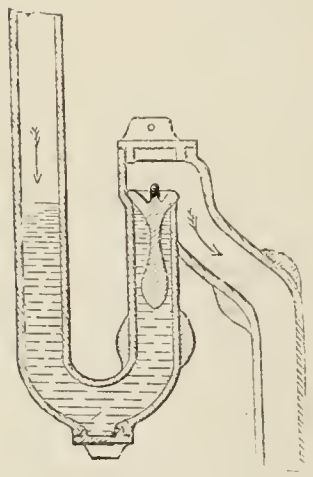
their wares to fifty millions of people, waiting in simple faith to be healed. And how appropriately does he typify the chaste and devoted physician and the simple, credulous faith of the people, in the character of the virgin. Our belief in inspiration is strengthened as we read it. But we are told, elsewhere, that there were wise virgins and foolish virgins. The foolish sought oil of the wise, but, if I remember correctly, they did not get it,—oil is often used as an emblem of healing. But it is no part of my purpose in this paper to arraign the medical profession in any way, or to decry the proper use of medicine. No man holds in higher esteem than myself, the noble army of men who devote their talents and their lives to lessen suffering, and to prevent, and to aid in its cure when they can not prevent, disease among their fellow-men. No man has greater faith than I in the value of the right medicine at the right time in disease; and no man realizes more fully than I the folly and danger to the public health of the constant dosing and drugging to which many physicians often lend themselves, and the people oftener submit. I suppose it may be stated as a truth that ministers are, as a rule, as honest as their parishioners; lawyers, as their clients, and doctors, as their patients. Whether this be true or not of the ministers and lawyers, I feel warranted in making the statement in behalf of the doctors; and of adding that often the doctors dare not be as honest as they would like to be. For it is a fact which every physician will bear me out in stating, that the large majority of persons who seek the advice of a physician, believe they want medicine and expect to get it, and that they generally estimate the ability of the doctor, and gage the amount of his fee, by the quantity he prescribes. If the physician could always feel sure that his advice would be followed and his fee paid, he could afford to be honest with himself and his patient and dismiss him with advice instead of medicine. But he knows if he does not prescribe medicine, his patient will go to some one who will; and so, to save him from falling into the hands of the quacks and imposters, and to save to himself the fee, he prescribes a placebo to make sure his advice will be followed. This satisfies the patient and the druggist, but benefits no one except the druggist.

A man calls to consult the physician about his wife. She has been running down since about harvest-time; feels tired; has pains in her back and limbs; has no appetite and does not sleep well at night. Upon inquiry, the physician finds she has had the care of three small children, and perhaps an old and feeble mother, and has been doing the work for six to eight men since the commencement of harvest. The doctor feels like exclaiming: "O man, in vain shall she take many medicines," and writing upon his prescription blank, "One stout Dane girl, to be repeated daily." But he remembers his fee and the future patronage of the family, and dares not be as honest as he would, and prescribes a tonic instead. A mother calls to consult about her young daughter. Of late she has grown pale and listless; has dark circles about her eyes; hands and feet are cold, and her head is hot. She has no appetite, is very nervous and weak, and can hardly drag herself to school. The doctor finds the daughter to be about 16 or 18 years of age, and until the past year was always rosy, healthy and strong. She has been attending school since she was 6 or 7 years of age. She expects to graduate at the next Commencement. For the last three years, in addition to her studies in school, she has taken from one to two lessons in music each week, and practiced two hours each day upon the piano. Of late she has been taking lessons in painting. The doctor looks thoughtful and suggests that she drop her music and painting. This the daughter could not think of doing. She has such excellent teachers, and it would put her so behind in her music and painting. Perhaps she could be induced to quit school for a year, and finish her studies when she has regained her health. No, she could not think of leaving her class; she stands at its head; and for the last year has been perfect in all her lessons, perfect in her deportment, and perfect in her attendance at school. The doctor mentally revolves in his mind what all this perfection implies,—long hours of study at home, six hours each for five days in the week in the school-room, crowded with pupils, with absolutely no place for the pure air to enter, or for the foul air, exhaled from the lungs of forty boys and girls, to escape, except through the doors and windows, with a temperature at least five degrees lower at the floor than it is four feet above it. No smile has lighted up her once bright face during all these long hours. No merry laughter, no loud talking, no whispering; not even a sly wink or a slyer note to one of the boys in her class. He sees all this implied in the perfection of the school-room, and he does not wonder that all her buoyancy is gone; that she is nervous and weak and pale, with large, dark circles about her once bright and laughing eyes; and he knows that in vain shall she "use many medicines." But the mother wants a tonic, something to tone her daughter up so she can complete her studies and graduate at the head of her class. She suggests iron as good to make blood, and the doctor prescribes it. Poor woman! she loves her daughter, and is anxious for her to succeed in school and in society, and she can not understand that she is crowding her into an early grave. She does not know and will not believe that pure air, exercise, new milk, fresh eggs and juicy beef are the best tonics, and will make more and better blood than all the iron in the universe. She gets her tonic and the doctor his fee, and the druggist his; but the daughter does not get her rosy cheeks again, nor lose the dark circles about her eyes. She tries "Brown's Iron Bitters," "Harter's Iron Tonic," "Caswell and Hazzard's Beef, Iron and Wine," granulated and peptonized beef, beef with lactopeptine, Liebig's extract of beef, and so on down through the list,—everything but beef straight, with pure air and exercise. But it is not pleasant to follow farther. Let us leave her, a victim to bad air, exhausted nervous force and "many medicines."

A young man calls. He is a bookkeeper and cashier in a large manufacturing establishment. He is shut up in a small, over-heated, and badly-ventilated office, from eight to twelve hours each day. He is pale, almost bloodless; his hands and feet are cold; he stoops; his chest is narrow, and of late he has had a short, hacking cough, and has occasionally spit blood. You would hardly think he had an ounce in his body. He, too, wants a tonic,—something to strengthen him, and to quiet that cough so that he can continue in his position. He is warned and advised, but he came for medicine and not advice, and he gets it, and goes back to the little room that opens into the grave.

These are no fancy sketches. They are taken from the records of actual practice, and can be duplicated by every physician who listens to their recital, and need not be multiplied here. I think I am warranted in making the statement, and in calling upon all honest physicians to bear me out in making it, that four-fifths of all the persons who consult a physician come for medicine and not advice, and are not satisfied unless they get it. And the physician who prescribes the greatest number of powders and pills, and the largest bottle of medicine, containing the longest list of ingredients, and is particular to mention that at least one of the number is a "new remedy" just discovered, and ordered by the druggist for his particular use, can, beside his percentage on his prescriptions, exact the largest fee, and will be oftenest consulted.

(To be Continued.)



WARING'S CHECK VALVE.

THE HOUSE INTERIOR.

Never did the materials offered for house furnishing present greater possibilities for artistic decoration, and, at the same time, so nearly solve the problem of combining comfort, healthfulness and beauty in the interior arrangements of a house, as at present. Opportunity for lavish expenditure in massive furniture, elaborate carvings, and rich draperies, is also ample, but these alone, without an artis ic thought and fitness of design in their grouping, are coming to be considered only meaningless and cumbersome upholstery. The canons of household decoration sanctions many innovations which are not less valuable on artistic than on sanitary grounds. "People want tricks," recently said a well-known furnisher and decorator, who realized the necessity of telling effects and harmonious combinations in his work. To "the woman who dares" follow out her ideas of convenience and economy, art steps in to lend a helping hand. Fashion has already relieved her of one, and perhaps the greatest, sin against the laws of health in banishing the wool carpet with its fuzzy, dusty surface, from the floor, and substitutiing hard wood or even painted floors in its place. Where expensive rugs are beyond one's limited income, there are remnants of tbe finer grades of carpet to be had at the stores which are as soft in texture and offer as good color effects at a small fraction of the cost. The floors of most houses, however, are too poorly laid to be made respectable even with the aid of paint and putty. To relay them in hard woods costs no more than a good carpet, and even those who cling most tenaciously to their woolen dust-traps will soon become reconciled and attached to the clean, easily-kept wood surface. When relaying is not expedient, a straw matting makes an excellent substitute. A great improvement in this well-known floor covering has recently been introduced in the endless mattings, which are fine, close and smooth, and have none of the joinings which are always the weak places of the old-fashioned fabrics, being woven on twine instead of short lengths of grass. These mattings come in desirable shades of red, olive and the natural grass colors, and well put down, which, by the way, experienced carpet-layers consider their most difficult work, they are in every way satisfactory, being clean, even, and beautiful, and without the musty smell which is sometimes complained of in ordinary mattings. Ceilings and walls are more easily disposed of than floors, and a wise housekeeper will care less for elaborate and expensive decoration than for cleanliness, which, at least in this smoky city, can only be secured by frequently renewing the surface coverings. Yet inexpensive designs are not necessarily inartistic.

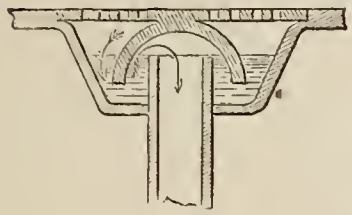
The wood mantel affords great scope for artistic design and decoration. Many beautiful specimens are shown, and some, which are on view at the store of William H. Foulke, on Wabash avenue, in connection with the Low art tiles, are very satisfactory. Many of them are made from special designs, either to suit a particular style of furnishing, or according to the individual taste of the owner. Some of these designs give opportunities for fine carving, or decoration with inlaid woods. Some superb pieces of wood carving are seen at this store, done by skilled French carvers in this city. Two panels have designs in high relief, one of fruits, pomegranates, and grapes with flowers, and the other, of flowers alone. The grouping is admirable, and the work shows great clearness and certainty. No article of room decoration can be made more effective than the mantel. A good design of some desirable wood with facing and hearth of art tiles, can be made a thing of exceeding beauty, and, framing a bright open fire with the lights playing on the smooth, well-colored tile surface, it becomes indeed "a joy forever." The Low tiles are produced in pleasing neutral colors and have a depth of tone and a perfection of glaze as well as thoroughly artistic design. Some of the sets made with a continuous floral design for mantel facings are exquisite. One shows branches of apple blossoms in relief on a bluish gray tile. Another of olive has tall plants springing from vases on the two sides, while across the top is a flight of birds. Hearths of the same material with a decorated border are also used. Other panels are used in combination with this wood work. Bevelled mirrors are set above the shelf, or, if a greater novelty is desired, there are reproductions of antique bronze in panels, which, though made of cast-iron electroplated, are so good in design and color that they cannot readily be distinguished from real bronzes.

For furniture one can find a variety of patterns and colors in rattan goods which are light and easily handled, and, if a sumptuous taste demands, can be cushioned with any upholstery fabric. A complete bedroom set in this material can be obtained, and chairs and sofas and tables are found in the most easy and comfortable shapes. The outer polished surface of the rattan is employed for the flat ornamental work while the rough inner part, or reed, is used for articles which are to be finished in color. The tints of the popular woods are used in this furniture, as well as gold and olive. Any sense of coldness which this ware suggests may be removed by the bright decorations of ribbon and plush, which can be so easily applied. An ornamental piece in accord with these furnishings is a screen in two panels, the frame being of cherry-wood with a lattice dado, and the panels of straw matting, on which is painted a bold design of apple boughs with the crimson fruit. The whole work is admirably effective. Chandeliers of brass and well-chosen ornaments of the same bright metal, with graceful trifles in porcelain and pottery, might complete a room which would be ideal in its comfort, and its clean, easily-kept belongings.

Mr. Haskins, the decorator in Central Music Hall building, has just completed a room in one of the finest of the new houses on Prairie avenue. It is a double room divided by an arch, and a Moorish design is carried out in its decoration and furnishings. Eeach unbroken wall space is treated as a panel and is covered with figured tapestry in terra cotta, the ground and the pattern giving two shades of the color. This is outlined with a border of lincrusta Walton, which carries out the tones in bronze, copper and gold. The remaining space between this border and the corner of the room is covered with putty, which is worked into a design in relief, and gilded. The ceiling is divided into panels and repeats the wall colors in lighter shades. A touch of blue in the cove gives a point of light and contrast. Between the windows, which are curtained as one with draperies of thin embroidered silk lined with a plain silk, is a mirror, and a pier glass in the room has a lincrusta border. The mantel is draped with terra cotta plush. On the hard wood floor are several rugs in Moorish designs and colors, and the furniture coverings are also of Moorish pattern. Instead of continuous picture mouldings, there is a separate brass rod for each picture which is hung by two perpendicular brass chains. The entire rooms are rich and harmonious, and the motive is consistently carried out, without the least approach either to monotony or discord.

Some of the new designs in furniture at the store of Wirts & Scholle, show a modification of the popular old shapes, gaining in convenience without loss of novelty or beauty. An arm chair of old oak has twisted rungs in the back which approaches the Gothic shape, and has four brass balls at the top. The legs are also twisted, ending in brass lion's-claw feet holding a ball of the wood. This design is repeated in tables of various sizes, some of solid mahogany, showing very good shapes. A

new and convenient English dressing table is of mahogany with a swinging glass above the left half of the table, and a cabinet with drawers and shelves filling the other half; below are drawers and a tiny closet, and under the left side of the table is a velvet covered roll which serves as a foot rest. The swinging handles of drawers and closets are of brass.



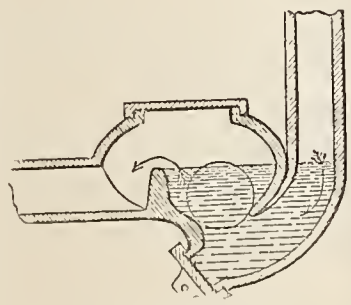
BELL TRAP.

A NEW YORK TENEMENT HOUSE.

A tenement house on Fifth avenue, between Seventy-first and Seventy-second streets, New York, capable of accommodating two hundred and thirty families, has been occupied for about eight months. The first floor is used by shops, which furnish everything the people need, from clothing and furniture to groceries. The suites contain from two to four rooms each, and are rented from $1.82 a week to $16 a month. These suites contain usually one large room, used for cooking and eating purposes, and smaller rooms for sleeping. The separate family life is provided for as much as possible. Each family has a compartment in the cellar in which to keep wood and coal, and elevators are used to carry these articles to the upper floors. Ash-shoots and water-closets are provided liberally. The garbage is all burned, and the cellars and ash-pits are cleaned every day. Every sanitary precaution, possible, according to a New York paper, is taken. Ice water in liberal quantities was supplied at the office free during the summer. The building is so open, so light, and so well ventilated throughout that the presence of vitiated air is said to be almost an impossibility. A breeze blows into the great court, which is open on the west side, constantly, and the difference between the temperature there and on Seventy-first street, outside, is very noticeable. On one of the hottest days of last summer the agent reported four persons sick in all the buildings—two women and two children—out of about seven hundred people. A careful record is kept of every case of illness, every birth and death that occurs in the building. During the entire summer, out of four hundred children there were three deaths only. During the same period there were five deaths among adults, one of whom died of old age, another of consumption, and a third of an abscess of the brain. Among the sanitary agencies are baths, which can be used daily—by the women in the afternoon and by the men in the evening. Another feature promotive of health is the play ground. The large interior court is an excellent place for children. Clothes are hung there the first three days of the week, but the other four the children have it all to themselves. There are laundries in the cellar and on the fourth floor, with stationary tubs and hot and cold water, the use of which is free to the tenants.

An interesting department is the reading-room and library, which is open every evening until 10 o'clock, and from which books may be taken. There are a number of magazines and newspapers, including a few French and German publications. Those nationalities, as well as the Irish, Scotch, English and Swedish, are represented among the tenants. A club-room for the men has just been started. There they find a writing-desk, chairs and small tables, and games of chess, checkers, backgammon, dominoes and cards. Good engravings line the walls, and altogether it is a very attractive place in which to spend a social evening. None but orderly and decent families are allowed in the building. The rules and regulations, a copy of which hangs in each suite of rooms, contain the following provisions: "Disorderly tenants will be immediately dispossessed. Tenants will be held responsible for all preventable damage to the apartments they occupy. In cold weather care must be taken to prevent freezing of the water pipes. Tenants must burn all garbage; throwing paper, vegetables, or other refuse down the ash-shoots is strictly forbidden. Nothing whatever may be thrown into the closets. Clothes may only be dried in the yard or on the roof. No animals will be allowed in the apartments or about the premises. In case of contagious or infectious sickness, notice must be given to the agent as quickly as possible."

It was expected, when the buildings were projected, that the tenants would be, though decent and orderly, of the poorest class. That expectation has not been realized. Attracted, perhaps, by the style of the building and the prospect of good, well-ventilated rooms, the tenement has filled up, not with day laborers alone, but with artizans and people with a good deal of intelligence. Most of them have one room "fixed up" with pictures, and perhaps a rocking chair and a lounge and a nice carpet. The capitalists who put up the buildings had everything done in the best and, at the same time, the cheapest way possible. They expect to get a return of 5 per cent. on their investment, and the prices of rent are adjusted on that basis.



CLIMAX TRAP.

THE MASTER PLUMBERS.

At the regular meeting of the Master Plumbers' Association on the evening of February 1, it was decided to keep a record of incompetent, unreliable and dissipated workmen,—in other words, a "black list." This will be on file at the rooms of the Association, accessible only to members. An invitation was extended to Mr. Allen P. Creque, of New York, to visit this city and explain, in an address before the Association, a new system of circulation in range boilers. Letters were read from Messrs. Weaver and Pennock, of Philadelphia, and others, who wanted copies of the constitution and by-laws of the Association, to assist them in organizing similar associations. The secretary was instructed to extend the thanks of the Association to both the gentlemen who delivered addresses at Fairbank Hall recently,—Drs. Jackson and Angear. Messrs. J. L. Pattison, Thomas Kelly and T. C. Boyd were appointed a committee to draw up a statement relative to the care of hot-water pipes and the precautions to be taken to prevent the explosion of water-backs in kitchen stoves. A communication was received from a committee of master plumbers in New York and Brooklyn asking for co-operation in some means of protecting the trade against abuses which had crept into it. The subject matter was so indefinite that no action was taken except to refer the communication to a committee. This meeting was one of the most successful of the Association, the attendance being large and the interest manifested greater than usual. It is intended to have a library and reading-room fitted up at an early date, which shall be provided with books relating to the trade, and the leading journals. Although no active steps were taken to this end, the matter was discussed and will undoubtedly be pushed through speedily.

DEATHS FROM PREVENTABLE DISEASES.

The following statement shows the mortality in this city, for the weeks indicated, from the leading zymotic diseases, consumption and acute lung diseases:

Week ending—	Small Pox.	Measles.	Scarlet Fever.	Diphtheria.	Croup.	Typhoid Fever.	Cerebro Spinal Fever.	Malarial Fever.	Consumption.	Acute Lung Diseases.
January 20	-	....	9	21	6	8	3	1	27	24
January 27	1	....	5	11	5	3	3	2	16	35

AMONG THE TENEMENTS.

A summary of the reports of the tenement and factory inspectors during the past two weeks shows the following defects in drainage, ventilation, etc., brought to light:

40 Lydia street, 2-story frame, 6 rooms, 2 families, 12 occupants; plumbing defective; service-pipe frozen; first floor used as a store-room for potatoes, kept warm during cold weather by open stoves, not connected with the chimney, from which coal gas escapes to upper rooms; children sick.

3015 to 3033 Cottage Grove ave., 3-story brick; 136 rooms, 40 families, 121 occupants; service and drain pipes frozen.

291 to 297 Wabash ave., 4-story and basement brick, 96 rooms, 17 families, 65 occupants; water-closets unventilated.

281 to 289 S. Clark st., 4-story and basement brick; 80 rooms, 27 families. 249 occupants; rooms overcrowded with lodgers.

128 Barber st., 2-story frame; 14 rooms, 6 families, 27 occupants; waste-pipe discharges into an open sewer.

226 and 228 Lake st., 5-story and basement brick; 3 factories, 1 store, 2 lofts; 170 employés; means of egress one rear stairway; a front stairway and 2 fire escapes provided after notice served.

543 S. Clark st., 3-story frame; 28 rooms, 20 families, 88 occupants; insufficient out-houses; overcrowded with Italian lodgers.

535 to 539 S. Clark st., 2-story frame; 25 rooms, 20 families, 85 occupants; plumbing inadequate, drains frozen; rooms overcrowded, floors full of holes, walls and ceilings dirty and roofs leaky.

221 N. Franklin, 2-story frame; 18 rooms, 4 families, 22 occupants; waste-pipes empty into wooden drain, which is ventilated by direct connection with the chimney.

148 Chicago ave., 3-story and basement brick; 13 rooms, 1 family, 17 occupants; no water because service pipes eaten by rats; water-closet contents leaking through ceilings.

142 W Lake st., 13 rooms, 5 families, 17 occupants; overcrowded; entire building in filthy condition, owing partly to defective drainage.

During the week ending February 3, the force inspected 80 tenements houses, 87 factories, 89 stores and 12 miscellaneous buildings. The tenement houses contained a total of 1,049 rooms, which were occupied by 317 families of 1,469 persons. In the factories, stores, etc., there were employed 2,639 persons, of whom 127 were boys and 9 girls. Forty-three notices were served and 34 nuisances abated.

CURRENT PUBLICATIONS.

POTABLE WATER.

This is the title of No. 61 of Van Nostrand's Science Series. It deals principally with the analysis of potable water, with special reference to previous sewage contamination. The author details the methods of water analysis, and, after showing how water used for drinking purposes may be contaminated by sewage, he comes to the conclusion that it is a most difficult matter so to purify it that it may be safely used, or, what is the same thing in effect, "the purification of diluted sewage to a sufficient extent to render it safe for dietectic purposes is an impossibility." This is very well illustrated in the condition of the water in the Illinois river, into which the sewage of Chicago is discharged, as far away as Peoria, two hundred miles from Chicago. The water of the river is contaminated by the sewage, and its odor is plainly distinguishable at the water-works of Peoria. The contamination is so pronounced that a very large proportion of the people of that city refuse to use the water, except for washing and scrubbing, and have, at considerable expense, constructed artesian wells for their use. The poor people are compelled to drink the foul liquid and suffer the results, which are said to be plainly marked. The paper by Mr. Folkard is discussed by several gentlemen of reputation.

SEWER-GAS AND ITS DANGERS.

This volume, published by Jansen, McClurg & Co., of Chicago, is a faithful account of the personal investigations made by the author in this city extending through several years. It shows that unquestionably the poisoning of the blood by sewer-gas is followed by terrible results, and that there is without doubt a connection between diphtheria and sewer-gas. The defects in house drainage are pointed out in detail, and remedies suggested. The book is written for the general public, and it ought to be in the hands of every householder, or house occupant. Its typographical appearance is not surpassed. The book contains twenty-one full-page illustrations. Such information is given as will enable any one to determine whether the drains of his house are in good condition and, should he build a new house, he is shown how the drains may be constructed to insure him against the dangers enumerated. The work is entirely impartial, containing nothing but plain facts, and is written for the sole purpose of enlightening those to whom house drainage has been a mystery.

THE POPULAR SCIENCE MONTHLY.

The editor of the *Popular Science Monthly* for February discusses "machine education," by which he means "the rigid, mechanical, law-established routine applied to great multitudes of children of all conceivable sorts who are got together in large establishments and submitted to operations that go under the name of mental cultivation." While he finds that good results cannot be obtained by such a system, he might have gone further and stated that the mind of the pupil is ultimately robbed of that spontaneity which characterizes the man of force and originality. Machine education is also detrimental to the physical development of children, and much might be said on this subject from a sanitary standpoint. This number of the magazine has a number of interesting and valuable articles, among which may be mentioned "The African in the United States," by Prof. E. W. Gilliam; "Natural Religion," by R. W. Boodle; a brief paper on "Social Forces in America," by Herbert Spencer; "Brain Power in Education," and "Science in the Sick-Room," by Clara S. Weeks. It is, as usual, a most valuable number.

THE CONTINENT.

The January numbers of *The Continent* are bound together and sent out as a "monthly part." It is an attractive magazine of 160 pages and 100 illustrations. Those who prefer to receive their periodical literature by the month cannot fail of being satisfied with this number. The more recent weekly numbers still are an improvement on those which have preceded.

BOOKS RECEIVED.

"Sewer-Gas and its Dangers; with An Exposition of Common Defects in House Drainage, and Practical Information Relating to their Remedy. By G. P. Brown. Chicago: Jansen, McClurg & Co., 117 and 119 State Street. Price, $1.25.

"House Drainage and Sanitary Plumbing." By Wm. Paul Gerhard, Civil and Sanitary Engineer; Member American Public Health Association. New York: D. Van Nostrand, 23 Murray and 27 Warren street. Chicago: Jansen, McClurg & Co., 117 and 119 State street. Price, 50 cents.

"Potable Water, and the Relative Efficiency of Different Methods of Detecting Impurities." By Charles Watson Folkard, Associate Royal School of Mines. New York: D. Van Nostrand, 23 Murray and 27 Warren street. Chicago: Jansen, McClurg & Co., 117 and 119 State street. Price 50 cents.

PAMPHLET RECEIVED.

"Scrofula and Its Gland Diseases." By Frederick Treeves, F. R. C. S. Eng., Assistant Surgeon to and Senior Demonstrator of Anatomy at the London Hospital; late Wilson Professor of Pathology at the Royal College of Surgeons, Philadelphia: Henry C. Lea's Son & Co. Price, 10 cents.

NOTES AND NEWS.

A London correspondent of *The Medical Record* says: Typhoid fever is still prevalent both in London and Paris. In spite of the progress made in sanitary matters and the improved systems of drainage, I cannot help thinking from my own personal experience of both cities that much still remains to be done, and that the present state of affairs is accountable for much of the typhoid now prevalent. In London, if not in Paris, the main drainage system is now complete and mostly in good order, but the drainage of individual houses is often defective. I have been in many West-end house in which the water-closets were placed in the center of the house and ventilated only to the staircase. I noticed this arrangement in the town house of the late Earl of Beaconsfield in which he died.

Dr. Brand, of La Rochelle, France, has an electro-generative torch or candle, which yields a current of electricity in the act of burning. It is prepared by making a paste of coal dust and molasses and molding it into a stick, which serves as the inflammable wick of a candle. This rod is then covered with asbestos in a thin sheet, and dipped into fused nitrate of potash until a good thick coating of the nitrate adheres. The wick being ignited it burns away, and a current of electricity is drawn from the candle by wires inserted into the nitrate and the coaly wick. Though this current is comparatively feeble, and not as yet of much practical value, the discovery is important as showing the possibilty of electro-generative fuels.

A machine is said to have been invented by a mechanic for the generation of heat in buildings where power is used, without fire. It consists of an iron cylinder about a foot long and a foot in diameter. The

bottom of the cylinder is a hardened plate, upon which another plate of the same diameter turns, the pressure being regulated by a screw, according to the power that is to be applied, and the amount of heat desired. All the space not taken up by the wheel and shaft is filled with water. As soon as the wheel is set in motion, the water is brought up to a high temperature and the cylinder becomes a stove, which radiates heat from the whole of its exterior surface.

Typhoid fever is reported to have made terrible havoc in the family of Rev. Mr. Hively, who lives near Iuka, Baxter County, Arkansas. The disease first appeared in September last, and carried off six of the children. The seventh child died on October 17, and on November 29, the eighth, a young man of 21, died. On December 23, Mrs. Hively became a victim, and on the 31st of the same month the ninth child, a boy of 14, died. The remaining members of the family, Mr. Hively and five children, were living at last accounts, but there were indications that they will meet the fate of the others, as the fever is not broken.

A firm in Pittsburgh is manufacturing glass shingles. It is claimed for them that they are more durable, stronger and more impervious to rain than slate or any other substance now in use. Their manufacture is said to be inexpensive. They can be used for siding houses, and, as they can be made of transparent as well as opaque glass, they will be particularly serviceable for conservatories or hot-houses. As glass is a poor conductor of heat, a house with a glass roof will be cooler in summer and warmer in winter than one covered with slate.

A bill has been introduced into the Illinois State Legislature provided for the establishment of an industrial home for boys and girls between the ages of 5 and 16 years. In addition to providing a home for such children as may be committed to its care, it is proposed that they shall be placed at employments and trades, and instructed in useful knowledge. The Home is to be located in Northern Illinois, not to exceed forty miles from Chicago.

The total number of immigrants landed at New York during the year 1882 was 520,355. Of these 166,824, or 31½ per cent. of the whole number, gave their destination as New York. The number returned to their homes in Europe was 1,410. During the year 21,341 meals were furnished to destitute immigrants at Castle Garden, and $13,194.23 was paid out to send immigrants to their destinations.

Diphtheria caused an excessive mortality during the entire past year, in England, the excess increasing as the year progressed. In some places there were marked epidemic outbreaks of the disease, With a view to acquiring further information as to the etiology of the disease, both the Local Government Board and the British Medical Association have instituted a series of detailed inquiries.

The electric light has been adopted at South Brancepeth Colliery, near Spennymore, Scotland. There are seventy-five lights in operation, the greater part of these being at the bottom of the two shafts, a distance of 430 yards from the pit's mouth. The new light is said to give most satisfactory results.

Very great concern is manifested at St. Petersburg over the enormous increase in epidemic diseases, chiefly diphtheria. The police and the medical and sanitary bodies have united in a general plan of energetic action for dealing with the outbreak and disinfecting houses.

The family of Dr. J. Q. Adams, of Dayton, Ohio, were seriously poisoned by eating canned rhubarb in pies. Dr. Adams was not expected to recover.

An entire family in New York were recently poisoned by eating fish. Their lives were saved by administering bismuth and opium. Portions of the food will be subjected to analysis.

The Omaha Electric Lighting Company recently started forty-one lights, distributed among business houses and on the streets.

BUILDING INTELLIGENCE.

The contract for the brick, masonry and iron work of the new West's Hotel, at Minneapolis, has been awarded to Agnew & Cox, of this city for $837,000. The entire cost of the building will be more than $1,200,000. The style of the architecture is ornate classic, with Grecian and Roman treatment. It will be seven stories high, the dimensions 190x170 feet, and the capacity 450 rooms. The first story will be built of Joliet marble, and the upper stories of St. Louis pressed brick.

The lumbermen of this city are circulating a memorial to congress asking that the bill providing for the removal of the tariff on Canadian lumber be not passed. It is urged that the removal of the duty will establish a ruinous competition with a traffic employing one million men and involving capital of not less than $1,000,000,000, and that it would be adding the present tariff to the value of Canadian standing timber, and not diminishing the cost of the building material to the consumer.

W. E. Taylor, of the firm of Cross & Taylor, a prominent firm of architects in Kansas City, died at his home in that city on Sunday, February 4. Mr. Taylor had recently opened an office in Chicago, and had for the past five years spent his time in railroad buildings as a specialty, having built the Denver, Kansas City, Atchison and Peoria Union depots. He was a member of the Western Society of Engineers, and was held in high esteem by all who had dealings with him. His age was 30 years.

The vacant corner at the intersection of Wood and Jackson streets will be covered by one of the best apartment houses on the West side, to cost $35,000. It will have pressed brick fronts on both Jackson and Wood streets. Furst & Randolph are the architects. At the corner of Jackson and Aberdeen streets Thomas Innes will build seven houses, to cost $45,000.

Burnham & Root have designed a beautiful residence for W. R. Lane, on Michigan boulevard, near Twenty-eighth street. It will be built of green stone and ornamented with red tile, after the style of the old Dutch architecture.

Two stories and a mansard are to be added to the depot of the Lake Shore & Rock Island railroads, at the foot of La Salle street. The shed will also be extended south to Harrison street. The freight-houses are being extended as well.

There is an indication that the anticipated extensive building in the spring will be checked by a demand from the Bricklayer's Union that on and after April 1, the minimum wages shall be $4 a day, and 40 cents an hour, an advance of 50 cents a day and 5 cents an hour.

It is stated that an apartment house, after an improved plan, will be built at the corner of Superior and Rush streets, just opposite the Fourth Presbyterian Church. Sets of flats will include rooms on two floors.

An apartment house is being designed by Architect Rehwoldt, to be located at the corner of Loomis and Congress streets. It will be 60x125 feet in size and cost $35,000.

James S. Carter and Gardener S. Chapin will each build fine residences at the corner of Michigan avenue and Thirty-seventh streets.

BUILDING PERMITS.

The following is a completelist of new buildings for which permits have been granted during the past two weeks, giving location, size, cost and name of owner. All buildings are of brick unless otherwise specified:

CHICAGO.

1236 Adams st., 1-story cottage, 21x30, $1,000; E. C. Chambers.
Weed st., corner of Dayton, 4-story factory, 40x80, $6,000; Pollis & Co.
Illinois av., near Thirty-second, 10 1-story cottages, 20x32 each, $8,000; S. E. Gross.
743 Hinman st., 1-story cottage, 20x30, $1,000; Anton Schmidt.
267 Thirteenth place, 1-story cottage, 20x18, $400; Henry Man.
612 Eighteenth st., 1-story addition, 20x14, $300; John Belsky.
10 Luce st., 2-story dwelling, 21x45, $2,200, M. Montosky.
454 Erie st., 2-story flats, 21x44, $2,000; F. C. Running.
18 Luce st., basement, 20x40, $500; M. Pill.
30 Bismarck st., basement, 20x30, $1,000; P. Iverson.
67 Cass st., 1-story addition, 40x48, $5,000; E. B. EcCagg.
276 Lincoln st., 2-story flats, 21x48, $4,000; O. B. Olsen.
Leavitt st., near Polk, 1 story cottage, 20x24, $700; Mrs. Mary Sullivan.
2808 South Park Av., 3-story flats, 27x60, $7,000; F C. Heath.
80 Hastings st., 1-story cottage, 20x26, $1,000; Aug. Hermwoski.
30 W. Indiana st., 3-story store and flats, 24x70, $9,000; Charles Bopp.
Loomis and Congress sts., 5 3-story dwellings, 125x60, $32,000; Mrs. B. Naghten.

MILWAUKEE.

Jefferson st., Third ward, frame warehouse, $1,200; J. G. Hanson & Co.
National ave., Eighth ward, frame dwelling, $900; J. Lindman.
Milwaukee st., Third ward, addition to frame dwelling, $1,000; A. N. Dickson.
Twelfth st., Second ward, frame dwelling, $4,000; N Neuschwander.
National ave., Eighth ward, frame dwelling, $1,000; E. Schultz.
Eleventh st., Fourth ward, brick dwelling, $2,250; J. Egan.
Fourth st., Fourth ward, frame dwelling, $750; C. Kropf.
Clark st., Thirteenth ward, frame dwelling, $8,000; A. Wolfenden.
Lloyd st., Tenth ward, frame store, $1,500; M. Grasson.
Ninth st., Tenth ward, repairs on dwelling, $850; H. Brustin.
Harmon st., Sixth ward, frame dwelling, $1,100; E. G. Taylor.
Thirteenth st., Second ward, frame dwelling, $1,800; C. Zwengel.

The Sanitary News.

By G. P. Brown.

ITS MISSION.

The Sanitary News is devoted to all that relates to healthy homes and healthy living, and is thus a journal for the people as well as for the trades and professions. It gives special attention to the architecture, construction, lighting, heating, ventilating, sewerage, furnishing and interior decoration of a building; city and country drainage, water and food supply, personal and public hygiene, etc. It is the only journal in the West devoted to Sanitary Science; in view of the wide field it has to work in and the increasing interest in sanitary scientific subjects, together with its present success, its future is most promising. The endeavor to make a paper which shall have artistic as well as literary and scientific merit, has met with encouraging approval, and no pains will be spared to keep it up to the present high standard, editorially and mechanically. The paper has already proved its value to its advertisers, among whom, it is a pleasure to state, will be found representative men in their specialties. The Sanitary News has already a large and increasing circulation, extending through nearly every State in the Union. It has received words of the highest commendation from every source.

TERMS OF SUBSCRIPTION.

The Sanitary News will be sent to any address for one year, for $2.00. Single numbers can be had of any newsdealer, at 10 cents each. The dates of publication are the 1st and 15th of every month; yearly subscriptions may begin with any number.

Remittances should be made by Registered Letter or Post-office Money Order.

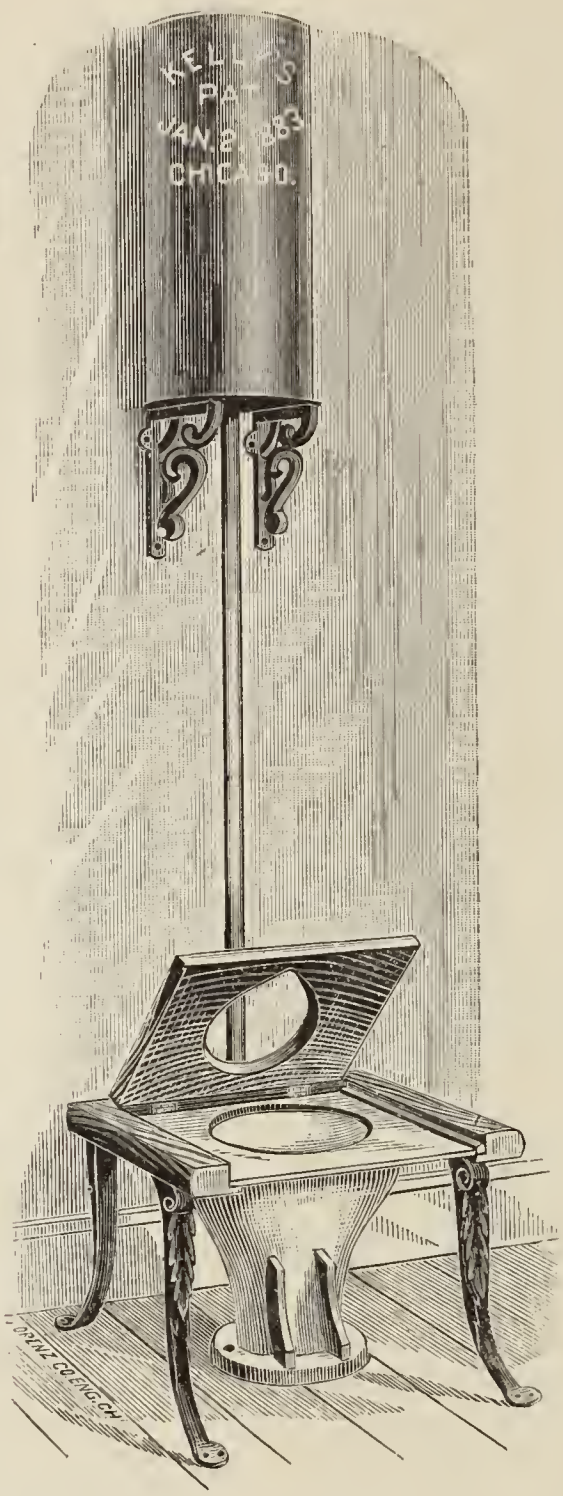
When any change of address is desired, both the old and new address should be given.

THE SANITARY NEWS,

144 Monroe St., Chicago.

BUSINESS NOTICE.

Attention is called to the new advertisement of Thomas Kelly & Bros., in another column, of Kelly's Patent Automatic Flushing Water Closet. As shown in the cut, it is a very simple and desirable closet, the operation of which is explained in the advertisement. It is certainly a water-waste preventive, and is also to be commended for its automatic action. It is being introduced in this city and elsewhere with great success.



THE KELLY

Self-Acting Closet

THE SIMPLEST APPARATUS

EVER DEVISED.

It is opeaated by the Seat. When the seat is occupied, the supply side of the valve is open and the waste closes, thus allowing the tank to fill. When the pressure is relieved from the seat, the supply side of the valve closes and the waste side opens, allowing the contents of the tank to discharge, giving the hopper a very thorough wash. The tank is air-tight, and does away with ball cocks and chains, valves, etc., as used in the open tank.

Self-Acting Urinals, &c.

To be seen at our show-rooms.

Send for Catalogue.

THOS. KELLY & BROS.,

186 Dearborn Street, Chicago.

National Union Vaccine Co.,

125 STATE ST., ROOM 17,

CHICAGO, - - - ILLINOIS.

E. L. GRIFFIN, M. D., Gen. Man'gr.

J. PETTET, M.D. CLEVELAND, O. ANIMAL VACCINE WHOLESALE & RETAIL

The following are fac-similes of the warranty accompanying each package.

Send Trial Order: if not satisfactory, either in price or quality, return it.

A Liberal Discount to the Trade.

Trade 5 POINTS, XXX COW-POX, $1.00. mark.

FROM

J. PETTET, M. D., Cleveland, O.

Year 11

Nos.

Any point in this package, used within 10 days, and after 10 days incubation, proven inert, will be replaced by fresh material upon immediate return of this wrapper.

Warranty begins when sold to the PHYSICIAN.

NON-HUMANIZED COW-POX,

FROM

J. Pettet, M. D.,

CLEVELAND, O.

—o—

Year 11.

Nos.

If this vaccine be used within 5 days, and after 10 days incubation be proven positively inert, it will be replaced by fresh material upon immediate return of this wrapper.

10 Points, Trade XX mark. $1.00.

DEATHS.

Annual Report of Deaths from Throat and Lung Diseases in Chicago for the Past Year, with Practical Observations on the Causes of Failure and their Proper Treatment.

[*From the Chicago Tribune, Feb.* 1.]

For the past thirty years it has been my invariable rule to publish an annual report of the mortality caused by the diseases embraced in my specialty, with such observations regarding their nature and treatment as seemed to me pertinent and of importance to the general public.

The records of the Board of Health show that there were 4,017 deaths from this class of diseases in the last year, which is considerably more than *one-fourth* of the gross mortality from all causes—including deaths by accident, violence, and still-born children. By separating these latter as not indicating perils to health by disease, it will be found that more than *one-third* of all deaths by disease result from the unsuccessful treatment of throat and lung complaints.

Bronchitis—This affection destroyed 463. It is a local disease of the air tubes of the lungs. It begins as a cold, which settles on the mucous membrane lining the tubes, and passes rapidly into inflammation. Before death ensues it has generally spread over the entire lungs, but at the early stage is confined to the larger tubes. It may terminate fatally in the acute form within two or three weeks from the commencement of the attack, but more commonly runs

THE SANITARY NEWS.

Vol. I. Chicago, March 1, 1883. No. 9.

CONTENTS.

CURRENT TOPICS:
- The Laying of Underground Electric Wires ... 97
- Novel Dress for Sanitary Protection ... 97
- Small Pox and Immigrant Inspection ... 97
- Commentary on Chicago Sanitary Engineering ... 97
- Setting Furnaces Without Fresh-Air Supply ... 98
- Systematic Sanitary Inspection of Houses ... 98
- Obstacles in the Way of the Tenement-House Inspectors ... 98
- Unsanitary Features of Seaside Resorts ... 98
- Effect of Quinine on Bacteria ... 99
- Suits Growing Out of Defective Drainage ... 99

HOUSE DRAINAGE AS IT IS. III ... 100
SEPARATE SYSTEMS OF SEWERAGE ... 101
POPULAR ERRORS ABOUT MEDICINE. By John Avery, M. D. II. ... 102
SPECIFICATIONS FOR THE CRIMINAL COURT BUILDING AND JAIL REPAIRS ... 104
THE HOUSE INTERIOR ... 105
THE PREVENTION OF DIPHTHERIA ... 106
CORRESPONDENCE ... 107
CURRENT PUBLICATIONS ... 107
NOTES AND NEWS ... 107
BUILDING INTELLIGENCE ... 107

THERE are said to be almost five thousand miles of underground telegraph wires within the small area described by a four-mile radius from the post-office of London, and none of the lines interfere with one another. This proves that electric wires may be laid underground with success. Active preparations for the burying of wires in this city have begun, and it is expected that a conduit for the use of the Postal Telegraph Company, from the city limits at the corner of Thirty-ninth street and Wentworth avenue to the office of the company on La Salle street, will be completed within a few weeks. The conduit will be of cast-iron, four inches square, and laid on the side of the streets opposite the water-mains. It is estimated that it will hold five hundred wires.

ACCORDING to *The Times* of London, there was recently exhibited at the rooms of the National Health Society, in that city, a novel dress intended for the protection of sanitary visitors, nurses, and others, who have to enter the rooms of persons suffering from infectious diseases. The garment is of mackintosh, glazed inside and out, and made completely to envelope the wearer and with a hood to cover the head. Thus only the hands and face remain exposed—a matter considered of comparatively little importance, as these can be easily washed with disinfectants. A not less important object proposed to be effected by the use of this dress is that by its removal when the wearer leaves the sick room the clothes which have been protected need not be changed, and the danger of the disease being carried from house to house or communicated to susceptible persons in public vehicles is obviated. A tight case for the fever dress to be enclosed in is part of the invention. At the end of the day, or as often as may be convenient, the dress can be cleansed with disinfectants. Further protection is given by a simple form of respirator. This is made of two folds of thin washing net, between which is placed a layer of medicated cotton-wool, through which the wearer can breathe though no germs can pass. The respirator has tape strings which tie round the ears. After use the wool is burnt and the net washed.

THE re-introduction of small pox into the interior States, and especially the West and Northwest, by immigrants, is again a foregone conclusion unless Congress shall appropriate the money so much needed in the Immigrant-Inspection Service. At present writing there is little ground for hope that this will be done. A result of this non-inspection is already shown. There is no officer at present at Detroit, and only one at Port Huron, who can not alone do all that is required. Recently a family of Holland immigrants arrived at Grand Rapids, Michigan, whose three children were very ill with scarlet fever. The family arrived without baggage and in a very destitute condition, becoming county charges at once. It would have been the same had the disease been small-pox. But they might have been intercepted on the road, at least at Port Huron or Detroit, and the spreading of the contagion entirely across the State prevented.

The wretched condition of the drainage and ventilation of the Cook County Jail and Criminal Court Building has had the effect of almost suspending business and turning the institution into a hospital. Judge Tuley was compelled to adjourn court last week because of the effect of the foul air upon his health, and many others were made sick. There is a prospect of temporary relief now, as the contract has been awarded for repairing the drains and plumbing, and work has already begun. The specifications for this work were prepared by the architect who planned the abominable system in the first place. A full abstract of these specifications is published in another column of this number of THE SANITARY NEWS; it is a sad commentary on the knowledge of sanitary engineering in Chicago. The architect has retained objectionable features in the original system, apparently for no other reason than because their removal would have been an admission of error in the first place. However, there are some improvements, and the building will be inhabitable again. How long it will remain so will depend upon the care exercised by those in charge of it. The ingenuity of the latter may correct some of the stupid errors of the architect, but it is likely not. For example, certain steam-coils in the basement having been cut off from a fresh-air supply through the underground ducts, to avoid the contamination by sewer-air, it is now provided that the windows in the outer-walls shall be removed and the frames covered with a wire gauze

through which air shall enter and pass, through the open rooms of the basement, to the steam-coils. This will give the plumber additional employment in the winter in repairing frozen waste-pipes and service pipes; or, more likely, the engineer will find the superabundance of cold air cooling his pipes too rapidly, and he will "stop up" the windows. "Fresh" air for warming upper rooms will come then, as now, from a filthy basement. The contract for the work according to the specifications has been taken by Messrs. Bufton & Boyd for $10,348, who will undoubtedly do their work well.

Somebody is to be blamed for the pernicious practice of setting furnaces in the basement, or cellar, of a house without providing for a supply of fresh air. It is probable that thirty per cent. of the furnaces in dwelling houses in this city have no communication whatever with the external air except through the chimneys. The furnace stands on legs which raise it five or six inches above the floor, and air is drawn from the room in which it is placed and sent upward through the registers in the rooms to be heated. As the furnace cannot supply heated air unless it is furnished with air to heat, the currents set in toward the furnace through cracks and crevices, from broken drains and from the ground itself. If there is any foul air in the basement or cellar, it is sure to find its way to the furnace and be sent upward for warming and breathing purposes. But, if it is granted that drains are intact, kitchen and hall floors clean, and the space under basement floors free from rubbish, it is still true that the cool and foul air of the upper rooms will descend to feed the furnace. There will thus be a continuous circulation of air within the house, which will be warmed and breathed over and over again, until it cannot but be most dangerous to health. There is another thing to be taken into consideration. Furnaces are so poorly constructed, as a rule, that gases will escape through defective joints from the burning coal, and are a constant menace to health. Furnaces should be subjected to a test, so far as construction is concerned, and none should be allowed in a house which has not flues to supply fresh air from the outside.

The subject of the sanitary inspection of houses is receiving marked attention in London. At present such work is confined to the parochial inspectors of nuisances, and, judging from what might be expected of the district, or ward, inspectors here in that line, the work cannot be very well done. The advantage which Chicago has over London in this matter is in placing the sanitary inspection of buildings in the hands of a force trained specially for that work; but even here they seldom visit any but tenement-houses and factories. A London gentleman proposes that sanitary inspectors of houses should be appointed by local authorities, but not allowed to act until examined by the Local Government Board officials and granted a certificate of competency; that such inspectors should be of a higher class and better paid than ordinary inspectors of nuisances, and to meet the increased expense without increasing the rates the local authorities should be empowered to charge a certain fee, to be determined upon, for each certificate granted by their inspectors under existing or any improved by-laws; finally, that every builder or house-owner should be compelled to produce such a sanitary certificate to a tenant on demand. Most of these points are covered in the work in Chicago now. Certificates of the sanitary condition of a house are not furnished by the inspectors, but their reports are kept on file at their office, to which any citizen has access. As to the examination of the men employed in this service, the Chief Inspector has authority to reject anyone who is not competent to do the work required of him. It is doubtful if tenants would demand a certificate of landlords or renting-agents even if the latter were required to produce them. When house-occupiers come to learn that there is such a thing as a sanitary condition of a house there will be little difficulty in securing healthy homes.

The obstacles encountered by the tenenent and factory inspectors are numerous. Unfortunately the authority of the Health Commissioner does not extend far enough. He should be authorized to tear down a building which has been declared uninhabitable, since it is almost, if not absolutely, impossible to keep people out of it, though repeatedly driven out. The Health Commissioner has authority to order a building vacated when, in his opinion, it has become a nuisance, but it would be a hardship, which he cannot reasonably be expected to enforce, to turn poor people into the street after they have paid rent a month in advance. The owners of the old rookeries on South Clark street and similar localities in the city require the pre-payment of rent, and they get enormous rates too. If the premises are vacated at the end of the month, in accordance with orders of the Health Commissioner, it is not a week before they are again filled with a new class of tenants, who have again secured a month's residence by advancing rent. The landlord can afford to take the chances of a lawsuit,—and so it goes. The uninhabitable buildings are declared nuisances and are condemned, but they are inhabited just the same. If the owner repairs the building, he is simply perpetuating a menace to health and defying the fire ordinance by reconstructing a frame building, the original construction of which is forbidden. If the rookeries and shells could be obliterated there would be an end to all the trouble and new buildings of brick or stone would take their place.

People resort to the sea-side for health, as they claim, when they pack up their summer finery and leave their comfortable homes at the most pleasant season of the year. There is no more healthful climate in the country, no purer water nor better sewerage than in Chicago, and yet there is a considerable exodus to the ocean when warm weather approaches. Few come back home improved in health or spirits, but rather much the worse for their trip. The reason of this is well given by Miss A. Hyneman Rhine, in *The Popular Science Monthly*. She says: "Among the thousands who go to the sea-side for health and pleasure, few pay any attention to the hygienic conditions under which they are to live for three of the most trying months in the year. The furniture of parlors and size of dancing rooms and amusement halls are taken into consideration, instead of finding out how sewage is disposed of and what relations cesspool drains are having with the wells. Land-owners and hotel-

keepers, following the drift of fashion, furnish what their patrons desire, neither side caring apparently how close a connection is established between animal excreta and the food which is eaten, the water which is drunk, and the air which is breathed. Nor is this carelessness confined to places merely fashionable. In Ocean Grove, a religious resort, no attempt has yet been made to remove fecal accumulations by means of sewerage, or to substitute cleanly earth-closets for the disgusting cess-pool and privy. Hence the wells are polluted by human excreta, and the air smells vilely, particularly during the period of the great open-air camp-meetings. At these gatherings over twenty thousand people assemble, who congregate together in a comparatively small space. The greater part of this multitude dwell in long lines of camp-tents, closely huddled together, and pay but little regard to hygenic methods. The executive committee of the association owning the place is equally neglectful, as they have made totally inadequate provision for carrying away the excreted material of so many people." The same may be said of the camp-meeting resorts about Chicago, and especially of Lake Bluff, the oldest and most frequented. Water may be had from springs some distance away, but the temptation is to use water from a spring near enough to be contaminated by the privies which overlook it. These out-houses are the foulest of the foul, having been used summer after summer by thousands of people. They are almost directly under the eaves of the hotel, and within twenty feet of the dining room and kitchen.. At night the odor which settles upon the earth,—for it is a tangible thing—is nauseating in the extreme.

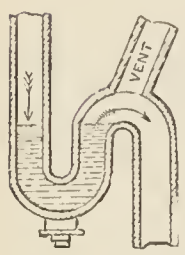
In some recent experiments Dr. N. H. Williams, of Jackson, Michigan, found that when, to an infusion of meat swarming with bacteria the one-ten-thousandth part of sulphate of quinia was added, and a drop observed under the microscope, there was a perceptible effect; a few of the bacteria were less active and a few were dead. When the sulphate was added in the proportion of eight-ten-thousandths all were dead. But the putrid odor was not affected. In other words, the quinia was antiseptic but not disinfectant. Bacteria were bred by putting into a fresh infusion of meat some of the sanious discharge from the nares of a patient suffering from malignant diphtheria. The discharge was swarming with minute life, whether peculiar to the disease or not, the doctor could not say, but they differed in appearance from any seen elsewhere. To this liquid three-ten-thousandth parts of quinia were added, and in a few minutes all the bacteria were dead, and none of the peculiar-looking organisms were again seen alive, although bacteria of the common type appeared. Bacteria, he says, seem to require an alkaline liquid, and the addition of an acid sufficient to change the reaction of the liquid lessens their activity, and, if added a little more freely, is destruction to them. Hence the topical use of any acid will act antiseptically. In this respect, they are in direct contrast with fungus life. In the treatment of diphtheria, then, the question of local applications, whether acid or alkaline, will depend upon whether the disease is of fungus or bacterial origin. As bacteria thrive in the warm blood of the body, it is not to be considered surprising that in some diseases that fluid is swarming with them. Dr. Williams suggests that sufficient quinine can be given to destroy any bacteria in the blood. The same could be said of the other cinchona alkaloids, and perhaps of many other substances.

The suit brought by Mrs. Georgiana Pierce against her landlord and his renting agents for damages for defects in the drainage of a house she occupied at No. 474 West Randolph street, mention of which was made in the last number of The Sanitary News, resulted in her favor, the jury awarding her $1,000. The verdict stands only against the agents. The latter at once appealed the case, although they failed in their endeavor to show that the house was in a sanitary condition. In another suit, brought before Justice Brayton within the past ten days, in which the tenant was sued for non-payment of rent because of the unsanitary conditions of the premises, the decision was in favor of the defendant. The premises in question were the main floor at No. 541 West Madison street, which were occupied by the defendant as a store. After two years' occupancy, ending May 1, 1882, no lease was signed by the tenant, but he continued to occupy the store under the verbal agreement that the plumbing should receive some repairs, and that calcimining and painting should be done. These things were not attended to by the plaintiff, it was claimed, and at length the water-closets and sinks of the tenements above became so dilapidated that sewage and kitchen waste leaked through the floors, damaging goods, and causing such a nuisance that every member of the family below was prostrated with sickness. The defendant finally moved out, refusing to pay his rent. Justice Brayton held that he was only a tenant at will, and could be held only for the actual value to him of the premises; but as the evidence showed that they were unfit for habitation during the two months named they were, therefore, worthless. The case was dismissed with costs. There is another side to such cases as this, which does not seem to have been brought out in the court proceedings. Tenants are often utterly disregardful of the care of the premises they occupy, and much of the nuisance which results from broken drains and overflowing water-closets should be charged to them. An illustration of this came to the notice of The Sanitary News a day or two ago. In a flat on West Madison street the water-closet, or soil-pipe, became clogged—probably because old rags or other similar refuse had been thrown into it—but the tenants continued to use it just as before. In a very short time it over-flowed and the waste found its way immediately through the ceiling of the rooms below. These people, too, claim to be respectable and decent.

The city of Dayton, Ohio, has had the electric light on trial for ten days, or two weeks, for lighting its streets, and with apparent success. Forty-eight lamps are now burning. It will require two hundred to light the city, at a cost of $33,332 a year. The gas companies' estimate is $37,500. The citizens express themselves as much better satisfied with the electric light than with gas, a single lamp giving a good light for a distance of half a mile. It is proposed to furnish private houses with the light at $12.50 a lamp per year, if burned no later than midnight; and $15 for all night.

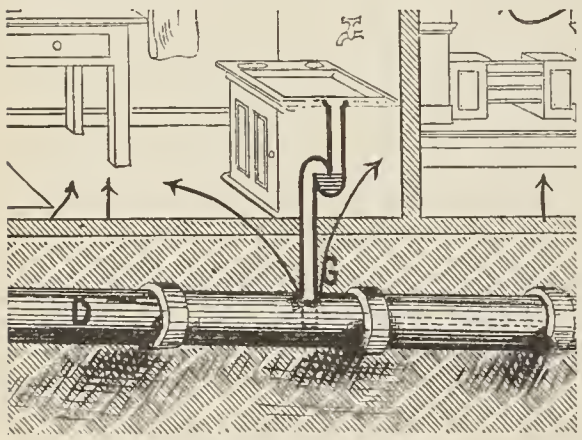
HOUSE DRAINAGE AS IT IS.

III.

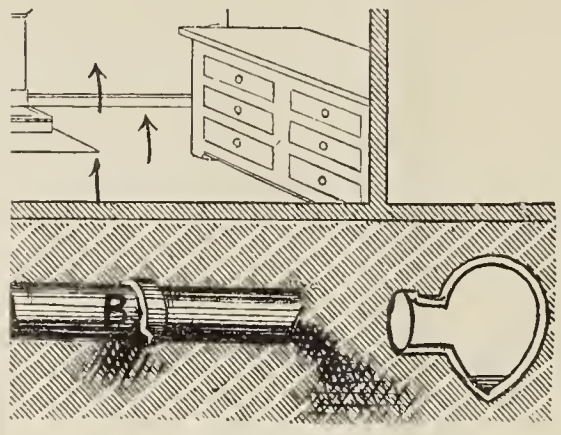


S TRAP.

Until recently the main drain has been constructed of sewer pipe, which differs only from ordinary drain tile in being harder baked and glazed by some process which is supposed to destroy its porosity. The sections are about two and a half feet in length, and are united at the ends by cement. It is not necessary to go into the details of this construction; it is sufficient to say that the end of one section has a hub into which the end of another section fits. When put together cement is applied on all sides, or it is intended that it should be, and an air-tight joint made. The fact is, as will be found on examination of most drains, that cement is applied either on the upper side of the joint only, or so carelessly on all sides that water will readily pass through it. It is not often convenient to apply cement to the under side of the pipes, and this accounts for its omission. The result is indicated in the illustration given below. The earth under the house very soon becomes saturated with sewage, and the gases generated by it and drawn up into the rooms through the furnace flues, or by the natural heat of the house, are precisely the same as those which come from the sewer itself. Sewer-builders and drain-layers have become so habitually careless in this work that they seem, many of them, to think that there is nothing wrong in it. When the Central Music Hall in this city was built two or three years ago such deficiencies were discovered, but the drain-layer stoutly maintained that there was nothing wrong. The drains were tested by closing them near the outer wall of the building and filling them with water—or attempting to do so,—but the water escaped as fast as it could be run in. Hardly a single joint in the entire system was found to be properly made. The drains were all taken up and relaid in a bed of cement several inches in thickness. The drain-layer is not always to be blamed for imperfect joints, as the hub of the pipe is usually so small that a space hardly wide enough to admit a knife blade, to say nothing of cement, remains when the ends of the pipe are put together. It can be easily determined whether the main drain leaks, by closing it near its outlet and filling it with water. If the water does not escape there need be no uneasiness. The illustration also indicates a defect in construction which is by no means uncommon. To save the trouble of putting in a piece of sewer pipe which has a branch extending upward, the drain-layer pecks a hole into a section of the pipe and makes such a connection as is shown. If he attempts to make a good joint by the use of cement, the chances are that the pipe has been cracked, if not badly shattered, by the operation. The ordinary method of connecting a soil-pipe, or waste-pipe, and the drain is by inserting the former in the open end of the drain, and closing the space between them with cement. As the drain is from two to six inches greater in diameter than the pipe which enters it, the difficulty of making a joint which shall remain air-tight is apparent. If the cement is above ground and exposed to variations in temperature and moisture it is sure to crack. Of course the test indicated above will reveal this defect, though it can usually be discovered by removing the floor of the basement or cellar.



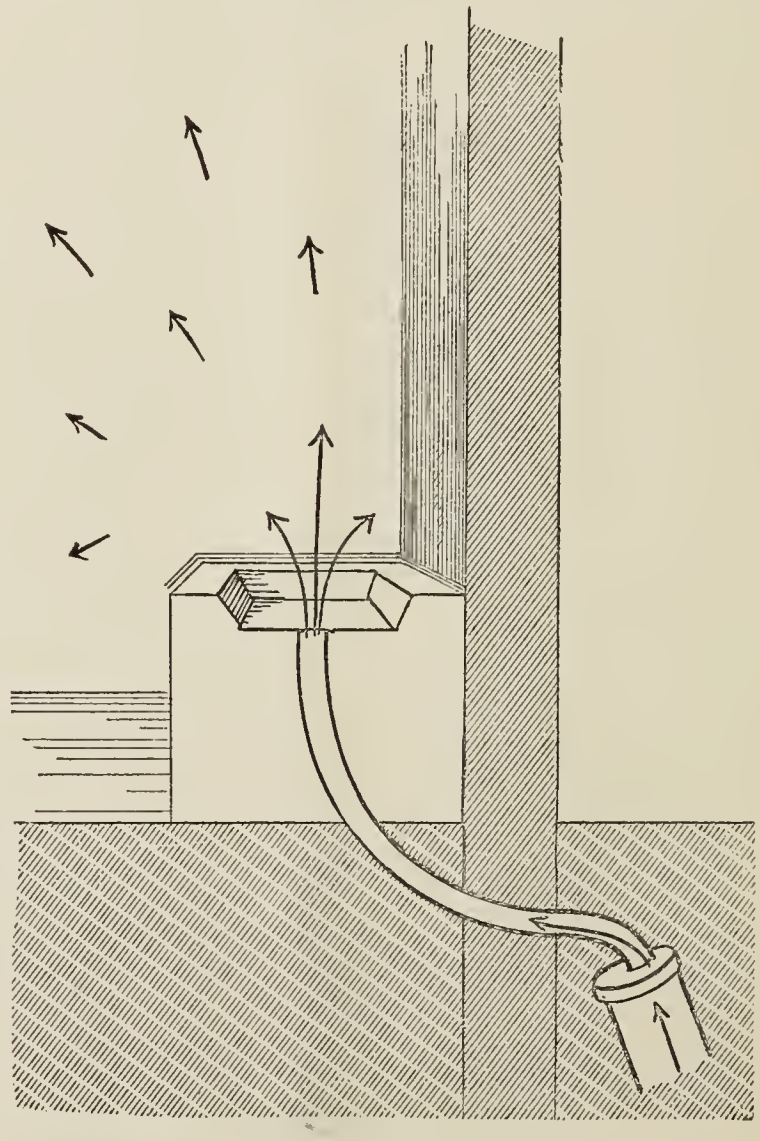
IMPERFECT JOINTS.



NO SEWER CONNECTION.

It is not an unknown circumstance that the drain should not be connected with the sewer at all. Such an actual and recent occurrence was related by THE SANITARY NEWS on page 49.

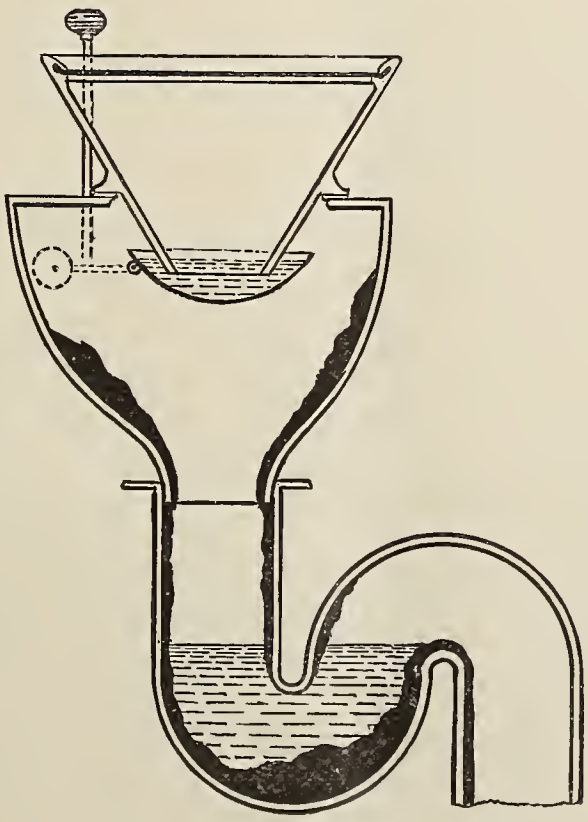
Another illustration is given below in which a waste-pipe from a sink is shown to be connected with a drain in the maner described. It indicates the comparative size of the two. However well this connection may have been made, direct communication with the sewer, or grease-basin, through the interior of the pipes without the intervention of a trap should not be allowed; and yet, it is not unusual to find an untrapped waste-pipe. It is probably true that the most dangerous gases come from the catch-basin, as it is called—an intercepting grease-basin,—and from deposits on the interior surface of the pipes themselves. A good trap will prevent the escape of these gases.



UNTRAPPED WASTE-PIPE.

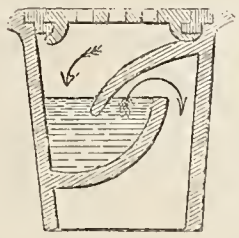
The ordinary S trap, shown on page 4 of THE SANITARY NEWS, is little better than none, as it is almost certain to be siphoned by the action of the water, when discharged, and there is then opened a communication with the drain. If the trap is ventilated at the top of the bend, as shown in the cut at the head of this article, this siphonage may be prevented. It is a very easy matter to determine whether a waste-pipe is trapped; if it is not, a good trap should be at once inserted. That which meets all objections best, probably, is Bower's trap, which is very generally used in improved drainage.

After drains may have been found intact, connections properly made and in good condition, and waste-pipes trapped as they should be, there is still an abomination in the house if the time-worn, but not time-honored, pan water-closet is in use. It is described in "Sewer-Gas and its Dangers," as follows: "Looked at from the outside it is harmless enough, and, when used by people who have some respect for cleanliness, it need show no signs of filth. But, like the soil-pipe and the waste-pipe, it is the source of hidden dangers, of which there is universal ignorance. All that can be seen from above is the pan, which holds a cup of water, supposed to form a seal at the bottom of the earthen bowl, thus preventing the return of any offensive gas. When the closet is used, and the pan is tipped to one side by the handle which extends up above the seat, its contents are dropped—where? Not into the sewer as many undoubtedly imagine, but into a cesspool just under the closet and out of sight—the trap. The pan flies back to its original position and fills with water. What follows? The excrementitious matter in the trap cesspool evolves an offensive and dangerous gas, which is held in the container until some one provides it with a means of escape when the closet is next used. The puff of foul gas which disgusts those who use water-closets is familiar enough. In the illustration there is an attempt to show how the filth which is suddenly dropped from the pan splashes against and clings to the sides of the container. This will remain to give off its exhalations long after the cesspool has become clear. The container is made of cast-iron, and with its rough sides is well adapted to catching and holding what is thrown against it. Its interior is beyond reach, thus defying all attempts to clean it. It is joined to the earthen bowl above it with putty, which often becomes cracked, and the joint is then defective."



THE PAN CLOSET.

SEPARATE SYSTEMS OF SEWERAGE.



ANTILL'S TRAP.

George E. Waring, Jr., has the following on "Separate Systems of Sewerage" in the last number of *The American Architect:* I have had the satisfaction of seeing the sewerage works of Lenox, Mass., Cumberland Mills, Me., and Memphis, Tenn., in which I secured the exclusion of all or nearly all of the rain-fall (in Memphis complete exclusion), followed by a considerable extension of the principle of separation in American work, and, to a much greater extent, in recommendations which are not yet executed. Some of the plans recently made have followed, without change, the separate system of England, which originated more than thirty years ago, and which, in spite of certain grave defects,—defects more important here than there because of our longer droughts and heavier storms—found much favor as an improvement on the combined or storm-water system. In the American recommendations, the separate system is generally, however, blended with a storm-water system in such a way, that, while some of the sewers receive only roof-water, they generally deliver into or in connection with others to which street-wash is admitted. Such a blending is sometimes advisable; but, except in cases of necessity, it should, in my judgment, be avoided. What I desire here especially to emphasize is the radical difference between the strictly separate system as carried out at Memphis and the partially separate system of England. This latter was introduced by Pilbrow, at Tottenham, about 1851, and has had some adherents ever since. For a long time it had very few among the better sewerage engineers. It is not a strictly separate system; that is, while it excludes street-wash, it admits roof-water and generally water from back-yards. This for two seasons: First, to provide for the flushing of the sewers by storm-water, which, in that country of frequent rains is, for a good part of the year, tolerably effective; and partly—and this is important—because under the English law a householder cannot be required to make two drains from his premises, nor can he be prevented from admitting roof and yard water to the drain that he does make. Neither is there any absolute restriction as to the provision he must adopt to secure the exclusion of rubbish from his yard-drain. Therefore the "separate system" of England is a restricted rather than a separate system. In order to provide, so far as practicable, for the removal of materials admitted to drains from yards, it begins usually with a diameter of nine inches, and it increases very rapidly in size up to twelve or fifteen inches of pipe and larger sizes of brick sewers.

Latterly, the system has had considerable extension in the case of towns which have been required by legal process to refrain from delivering their sewage into water-courses until purified by irrigation or other process. Compliance with the requirement is made cheaper by the restricted system

than by a full storm-water system, because the amount of water to be handled in wet weather is much less than if the street-wash were added. While in London last autumn I had conversation with several engineers who have recently constructed works of this kind. Their tone was universally to the effect that it was a system which would do, and would generally do very well under circumstances where it was necessary. The number of those practising it who gave me the idea that they would practice it in the absence of the legal requirements above referred to was small.

The objections to the system, which have much greater force here than they have there because of the much longer periods during which with us there is no rain, and because of our heavier rains, are as follows: (1) Owing to the great size necessary to give to the pipes, the flushing effect of the daily maximum flow is enormously reduced, so that, even with the short intervals of drought in England, deposits in the sewers are very common, and the rain-flow is frequently only sufficient to wash together these deposits and the rubbish admitted from the court-yards, so forming actual stoppages. The need for constant watching and frequent removal of obstructions is very great, and has been cited in engineering discussions as a serious objection to the system. (2) Of course this deposition of materials between storms, if it lasts more than a day or so, becomes a source of great foulness, and the atmosphere of these sewers is worse than that of ordinary storm-water sewers. One engineer, who has always been a champion of the separate system, showed me the drainage of a large private house and grounds in London, executed under his direction and regarded by him as a model of excellence. It depended for its flushing on roof and yard-water. It had rained within a week, yet on opening some of the well-ventilated man-holes to examine the sewers, the air was found to be as foul as that of an ordinary house-drain or cesspool. (3) The system is very costly. If rain-water is to be admitted even from the smallest surface that will give a flushing quantity during moderate rains, it is necessary to give the sewers a sufficient capacity to remove all the water that can fall on this surface during a sudden, heavy shower, when from one to two inches in depth over the whole surface must sometimes find its way to the sewers within an hour—occasionally within much less time. If the sewers are not of ample size, sewage sets back into house-drains during such storms. It is this requirement for large diameters which makes the sewers so foul, as indicated above, and which makes them, in my judgment, quite inadmissible here, where there are often very long intervals between storms.

To give an idea of the cost of such work, I have had prepared an estimate of the sizes that would be needed for a sewer beginning twenty-five feet west of Third avenue in New York City and discharging into a sewer in Sixth avenue, a distance of 2,985 feet, supposing it to have a fall of 1 to 200, draining every house on the way—the area being fully occupied and peopled—and receiving the rain-fall from roofs and the paved portions of yards equal to a width of fifty feet on each side of the street. The calculation assumes a rain-fall of one inch per hour, reaching the sewers at the time when they are carrying the maximum flow of house-sewage. I give an estimate of the cost of the pipes required and the cost of laying the same, not including trenching and backfilling, and not considering the extra cost of the wider trenches for the larger pipes, but including the cost of man-holes made necessary by the liability of such sewers to become obstructed, and offsetting these with the cost of a flush-tank at the head of a single line of six-inch sewers. Beginning with eight inch-pipes, we should require the following length of different sizes: —

8-inch	393	feet, cost, including laying,			30½	cents per foot	--	$119.87
10 "	320	"	"	"	46	"	--	147.20
12 "	530	"	"	"	53¼	"	--	282.22
15 "	1742	"	"	"	82	"	--	1428 44
Man holes, 9 at $40								360.00
								$2,337.73

If all the rain-fall were excluded and the sewer had to carry only the house-drainage, but a liberal allowance of this, the whole line might be made with six-inch pipes. Hand-holes and short lamp-holes could be substituted for man-holes, and a flush-tank at the upper end of the line would clean the whole length at least once a day. Such a sewer, with its flush-tank and all appurtenances, would not cost more than $900, excluding trenching and back-filling, as in the other case, but including royalty.

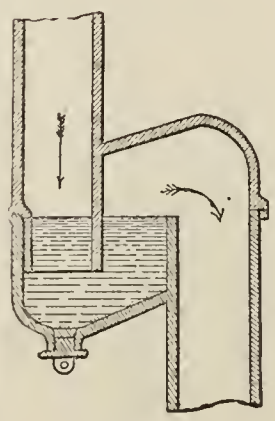
It is proper to say that wherever the English separate system is carried out, provision is made for flushing through man-holes, but this requires personal attention, which is never reliable, while the opening of man-holes leading to small pipes is a frequent source of the admission of substances which cause obstructions. The total cost of flushing and cleaning cannot be arrived at with accuracy, but it is in all cases necessarily much greater than the cost of a supply of water to an automatic flush-tank and of the rare removal of obstructions—which must have passed through four-inch house-drains and which are little liable to be arrested so as to form accumulations in well-flushed six-inch sewers. The proportionate costs, as shown by this example, would hold good—with perhaps an addition of $100 for flush-tanks where several branches would take the place of one straight line.

Concerning the relative cleanliness and consequent condition of contained air, of the two systems, demonstration must depend on observation. Those who have had occasion to observe and to report upon the odor attending each have fully established the fact of the much greater foulness of the English system.

POPULAR ERRORS ABOUT MEDICINE.

BY JOHN AVERY, M. D.

II.



ADEE'S TRAP.

There is yet a lingering superstition in the minds of many people,—and the medical profession is not wholly exempt from it,—that disease, if not exactly an evil spirit, is something akin to it, and must be exorcised, if not by actual incantation, by that greater mystery, the action of "many medicines." One remedy, if need be, and a few plain, simple directions about diet, exercise, rest, etc., do not satisfy them. "Go, and wash in Jordan seven times, and thy flesh shall come again to thee, and thou

shalt be clean" did not satisfy the Syrian leper. He wanted the prophet to "come out and strike his hands over the place and call upon the Lord his God." But the good sense of his servant saved the old heathen, and is as good to-day as when spoken to Naaman: "My father, if the prophet had bid thee do some great thing, wouldst thou not have done it? How much rather, then, when he said to thee, Wash and be clean." How many patients, to-day, would go "away in a rage" if a lesser prophet than Elisha should say unto them: "Go and wash." And yet this simple advice, if paid for and followed, would be worth more to them in dollars and cents than a hydrogen cathartic or an alterative tonic, composed of the mysterious "seven barks." But it would require the courage and honesty of the old Prophet to give it. The truth is, when people consult the doctor, they want to get the worth of their money, and they want it in something they can see, taste and smell; in short, something that will do them good; and their idea of that is something that will make them sicker before they are allowed to get better. If they do not get it from one doctor they will from another. Failing to get it, or what is more likely, getting too much, they abandon the doctors and take to "Kennedy's Medical Discovery," "Warner's Safe Kidney and Liver Cure," or "Lydia Pinkham's Compound," or some other nostrum put up in a quart bottle, advertised in an almanac, and for sale by all druggists. The extent to which these and the many kindred nostrums are used among all classes of people is appalling. High and low, rich and poor, educated and uneducated, servant girls and sewing girls, lawyers, judges, ministers and, I am sorry to say it, sometimes doctors voluntarily tax themselves to build palaces, steamboats and pleasure-yachts, and to buy fast horses and bull-dog pups for the millionaire proprietors of these health-destroying and disease-producing nostrums in almost every city in this country.

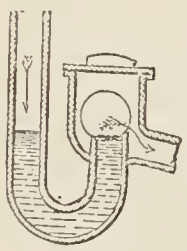
What is the cause and where is the remedy for all this? The cause lies in the superstition and credulity of the people. We are not iconoclasts in sentiment and feeling, whatever we may be in practice. We do not, any of us, like to see the idols we have worshipped destroyed. The delusions we delighted in and cherished in youth cling to us in manhood, and we do not thank any one ruthlessly to expose them. Many a grandmother and grandfather, too, will hang up their stocking on a Christmas Eve and be as delighted with the gifts of Santa Claus as the prattling granddaughter at their side. The mysterious has a weird charm for us all, and we cling to its traditions long after the mystery has been revealed to us. I remember once of hearing a very wise person explain to a little boy that there was no such person as Santa Claus, and the little manly fellow cried and said he knew it all the time, but didn't want anybody to tell him. The mystery of the fortieth dilution has a wonderful potency in the minds of its believers; exposed, it becomes shadow broth. Rob the prescription blank of its mystic "℞," its symbols of weights and measures, and its Latin nomenclature, and you lessen the effect of the remedy it orders in nearly the ratio the homœopath increases his by dilution. This superstition and credulity, lingering in the minds of the wisest of us, are seized upon by the artful advertiser and turned into money for his pocket. Perhaps he is an Indian doctor, captured when he was a small boy, and who studied his profession with the root-eaters of the far West; perhaps a retired clergyman, whose "sands of life are nearly run." Or, possibly, a Warner, who, having made a fortune by peddling safes, now seeks to rob them of their contents by making their owners believe they all have Bright's Disease. But whatever their name,—and it is legion,—their object, aim and practice is one, to deplete the purse of the people and to stimulate and make plethoric, as stimulants are said to do, their own.

The remedy is not so easy; but it is largely in the hands of the people themselves. Let them demand that the Legislature shall enact a law compelling every nostrum-vender to put upon every bottle and package of his mixture, in plain English, the name and quantity of each ingredient it contains, and make it an offense, punishable by fine and imprisonment, to violate this law. How exceedingly thin many of these wonderful compounds would look when spread out in this way on paper! When a person had learned that he could buy at any drug store for 10 cents the whole contents of a dollar bottle of "Liver Invigorator," he would not take the "Invigorator" nor buy the medicine at the drug store either. This much the people can do; and if they will do it it will save to them thousands of dollars of hard-earned money, and strength and ability to earn other thousands. The medical profession owes it to itself, to the honor of its high calling, and to the people whose mission it is to serve, to relieve itself of even the appearance of a desire to administer one unnecessary drug. The path of true medical science and research does not lie in the direction of the discovery of new methods of treatment or new remedies for the cure of disease. A broader, higher and newer field lies before it in the discovery of the best means to restrict and prevent disease. Nearly one hundred years ago Dr. Benjamin Rush, the father of medicine in this country, publicly thanked God that he had at last found the remedy to cure yellow fever; "and of the one hundred patients he had that day visited or prescribed for he had lost none." But when the shadow of the destroying angel fell upon New Orleans and Memphis in 1878 his vaunted remedy was powerless in its presence. It is said that Dr. John Clark saved the lives of more than sixteen thousand children in a single hospital by introducing a simple method of ventilation,—saved them by preventing disease, not curing it. Patriotism preserves to posterity the name of Benjamin Rush; humanity to helpless babes, that of Dr. John Clark. Is it not to be feared that the medical profession of to-day is traveling in the wrong direction? Our literature is teeming with the discovery of new methods of treatment, new remedies and the new application of old and well-approved ones. Our great laboratories are at work day and night, extracting, evaporating, pulverizing, compounding, combining, sugar-coating, gelatine-coating and capsuling every known plant and mineral in the universe, until our materia medica, like an old garret, contains a few things that might be made of use; but they are so hidden away and covered up by the ever-accumulating rubbish that they can not be found when wanted. The attention of the profession is constantly being called through the medical journals, many of them published in the interest of the manufacturers, to new drugs and new preparations and combinations of old ones, until the list grows so long that

to try all would be to experiment with all, and to know nothing of the action of any. We need to be on our guard lest we are swept from our moorings on well-grounded medical science by this popular and professional craze after new and "many medicines." A list of new remedies too often makes up the library and becomes the stock in trade of the medical practitioner. It is related of the late Judge Shaw, of Massachusetts, that, upon being told that Worcester had brought out a new edition of his dictionary, containing some thousands of new words not found in Webster's unabridged, he said: "Don't for the world tell Choate; he will have every one of them in his next speech." I have heard drug clerks express a similar anxiety lest a list of new remedies should fall into the hands of a certain class of physicians.

Nor is our attention limited to this long list of new remedies. We have a list of dietetic agents and compounds, nearly as long, furnished us by these labor-saving manufactories. They seem intent upon usurping the entire functions of the stomach and digesting the food of our patients in their laboratories. They give us food for infants, food for adults, food for the aged, and all so mixed up with drugs that it is difficult to tell whether we are giving nourishment or physic. We have "Liebig's Food," the "Imperial Granum," "Miller's Food," "Horlick's Food," "Murdock's Liquid Food," the "Anglo-Swiss Milk Food," the extracts of malt, wet and dry, beef extracts, beef granulated, beef with pepsine, beef with pancreatine, beef digested; and soon, no doubt, we shall have beef chymified and chylified, and beef assimilated. Then the poor stomach, robbed of all the duties it was designed to perform in the economy of the system, will be forced from pure ennui to go and submit itself to Bilroth's operation. It is unfortunate for the stomach, no doubt, but it is nevertheless true that it does not always take kindly to the chemistry of the laboratory. It sometimes even resents these infringements upon its prerogatives, preferring, rather, to perform a portion of the labor of digestion for itself than to have its products patented and mixed with its ingesta in the laboratory. All this is illustrative of the tendency of our medical literature and research at the present time, and warns us to call a halt in this direction. It is not a protest against the use of new remedies, or old remedies, or any remedies, but a reminder to the profession and to the people that nature has its duties and functions to perform in disease as in health, and that, while medicine may and sometimes does aid it in the disl charge of these duties, the true physician everywhere wil-add his protest against this constant dosing and drugging, whether found in the profession or out of it.

SPECIFICATIONS FOR THE CRIMINAL COURT BUILDING AND JAIL REPAIRS.



BUCHAN'S TRAP.

The following are the important points in the specifications for the repairs of the drainage, plumbing and ventilation of the Cook County Criminal Court Building and Jail, the work on which has been begun by the contractors, Messrs. Bufton & Boyd:

Remove the public water-closet opening into the jail yard at the west end of the Criminal Court Building, and seal up the sewer connections of these closets.

Put in new lines of nine-inch sewer pipe to connect the system of sewerage with the main boiler flue.

Remove the four small catch-basins at the end of the building where they connect with the soil-pipes, and connect the soil-pipes directly with the sewer.

Connect the ventilating pipe in the court-yard with the main smoke-shaft, and extend it up inside the shaft, secured to the inside angle with strong wrought-iron hooks, for a distance of fourteen feet above the point of entry into the shaft, this connection to be of twelve-inch pipe.

Put in twelve-inch running traps with man and hand-holes to each main line, covered with stone flagging and cast-iron cover.

Remove the four catch-basins which intercept the main sewerage pipes under the north corridor and provide a direct connection in these main lines of sewerage for the traps which are to be replaced at the bottom of the several lines of soil-pipe, throughout the entire male ward and boys' ward.

Take up the present branch sewer system immediately beneath the kitchen floor, and the catch-basin under the floor, and provide a new system to receive the soil-pipes over the kitchen, and the sewage of the kitchen proper; also, build a new basin four feet in diameter outside the kitchen, in the jail yard.

Put in new lines of pipe to unite the entire system of sewerage with the main smoke-shaft.

In the Dearborn avenue building take up the present branch sewers under the north and south ends of the building, and renew them with the best quality of Akron-glazed, stoneware pipe.

The contractor will carefully rod and clean out the entire sewerage, and repair and make good any injury to the old sewers that may be found.

In new lines of sewerage the material employed shall be the best Akron stoneware, glazed pipe, with flange joints, carefully sealed with Utica cement.

Take down and thoroughly clean, repair and reset all water-closets, wash-basins and urinals throughout the building. Extend the several lines of soil-pipe through and above the roof about four feet, and finish them off wi'h galvanized-iron Emerson ventilating caps. Provide and connect a two-inch cast-iron pipe with the top of each basin and urinal trap, and extend it four feet above the roof.

Repair and reset all traps, and where Bower's traps are not already in use, they are to be used in resetting basins and urinals.

Put 1½-inch extra strong lead wastes to all safes of basins, urinals and closets, and extend them to the cellar floor.

Increase to three times their present capacity the water-closet cisterns off the grand-jury room in the third story, and off the storeroom in the second story, or to about 6½x4½x2 feet in size, line with six-pound lead and retain the present city supply to each; also, supply each of these closet cisterns from the pump in the boiler-room.

In the Dearborn avenue building take down and remove the present water-closet in the basement, and seal up all the sewer connections, but not so as to intercept the connections from the water-closet system on the upper story.

Take up and reset the water-closets on the second story; renew the valves and extend the soil-pipes through the roof. Ventilate the traps with a two-inch iron pipe through the roof.

Put six-pound lead safes under the wash-basins in the judges' and jury rooms, with 1½-inch waste-pipe to run to the ground.

Provide each line of vertical soil-pipe in the large male and boys' wards with a heavy eight-inch cast-iron S trap.

Clean out all the closet pans in the cells, removing incrustations with acid or by burning.

Clean out and repair the present air tunnel extending across the jail yard from the fan-room of the south corridor of the large ward; build a floor of brick one foot thick on the present floor of the tunnel, so as to raise the present floor one foot, laid in Utica cement. Close up with brickwork all branch openings, or connections, and enlarge and extend the termination of the tunnel under the jail corridor, so as to make one continuous duct from the fan room to the jail. Plaster the entire inside of the tunnel with Utica cement mortar one inch thick. From the top of this tunnel at its northern termination in the jail build a circular air chamber, of six feet internal diameter, with walls of brickwork twelve inches thick laid in cement mortar, this chamber to form a terminus for the main air tunnel at the jail end. From this chamber extend eight

galvanized-iron pipes, one to each main stack of radiating steam coils, the pipes to be of No. 24 galvanized iron, heavily seamed with solder, lock-jointed and riveted and made air-tight, to extend along the ceiling of the cellar, hung to iron joists with strong wrought-iron hooks, and to bend and drop down the brick enclosure of each coil and open under such coil, so as to form a complete and uninterrupted connection from the fan to the heating system of the main ward. The openings into the inclosure around the fan are to be enlarged to double their present capacity.

Build around the main closet ventilating flues in the center walls between the cells an inclosure of eight-inch brick from cellar floor to ceiling, about 2½ feet square inside. Take out the present small steam-coils at the bottom of these flues and alter them to about twice their present heating capacity, and reset them at the top of the brick inclosure instead of at the bottom. Thence continue a one-inch steam pipe up along the entire length of each flue, and connect with it a similar new coil of the same capacity in the attic over the top of the flue, with return pipe complete.

Extend under the transverse brick arches of the cellar, beneath the cell floors, twelve independent horizontal ventilating pipes, two to each of the above-mentioned flues, these horizontal pipes to be fourteen inches in diameter, of No. 24 galvanized-iron, riveted, soldered, and lock-jointed and made air-tight, and painted inside and outside with a heavy coat of asphalt paint, and connected by five-inch cast-iron pipe with each line of soil-pipe at the nozzles already in these pipes for that purpose, each horizontal pipe to have a short fourteen-inch vertical pipe extending down the side of the brick inclosure of the heating coil and opening into and under the coil.

Build along the top of the central partition wall of the cells in the attic of the large male ward and the west ward a horizontal ventilating duct of No. 22 galvanized-iron, air-tight and to lead to vertical ventilating shafts of similar galvanized-iron, eighteen inches in diameter, with square boxes at the base, the connections sealed and cemented, the vertical shafts extending up to the top of the present ventilators in the roof of the jail.

The present ventilating terminals on the jail are to be taken down and repaired and reset, and new galvanized-iron ventilating caps put in, the entire galvanized-iron work to be painted on both sides with asphalt paint.

For the ventilation of the east ward of the jail extend from the main smoke-shaft in the Criminal Court Building, across the jail yard, along over the wall of the gateway into the kitchen and along the ceiling of the kitchen and the laundry for their entire length a fifteen-inch No. 24 galvanized-iron pipe. Fit up to this pipe four No. 22 galvanized-iron, well-shaped bonnets about three feet in diameter at the bottom, two in the kitchen and two in the laundry, to remove vapor and foul air from these rooms, the main pipe to turn up four feet into the smoke-shaft.

For closet ventilation in the east ward provide a line of twelve-inch cast-iron pipe with six branch connections to the present outlets in the soil-pipes. Connect this horizontal pipe to the bottom of the ventilating flue in the north wall of the kitchen, all joints to be thoroughly calked with lead. Take out the steam coil at the bottom of this ventilating flue and, enlarging it to double its present capacity, replace it at the level of the ceiling of the main corridor on the jail side of the north wall. Extend the steam supply up through the flue to the top, over the coping wall. Take down and enlarge the present brick top and rebuild it to double its present sectional area and four feet higher, put another steam coil of equal size at the attic level and cover the top of the shaft with a galvanized-iron globe ventilator, etc.

For the ventilation of the Criminal Court Building, repair the main ventilating duct leading from the fan-chamber and extend it to a point under the main hall. At this termination build a circular chamber of brick, six feet in diameter, and extend galvanized, fifteen-inch-in-diameter air-tight ducts to the bottom of the steam coils.

For the ventilation of the Dearborn avenue building conduct fresh air to the several stacks of radiating steam coils with fifteen-inch stoneware Akron-glazed pipe to extend under the ground from the area windows on Dearborn avenue to the bottom of the coils, and so turn up in front of the windows with bends to form bonnets to receive and conduct the air.

For the general ventilation of the entire building take out the present area window-sashes which light the sub-cellar on three street fronts and the east alley, and replace them with frames to open into the cellar, filled in with strong and close gauze screens of such pattern as the architect may select, so as to admit air at all times to the steam radiators.

THE HOUSE INTERIOR.

In the matter of floor and wall coverings the path to sensible, healthful furnishing is not difficult, and as fashion has already trodden it, it is easy following; but when it is proposed to carry out these ideas of comfort, cleanliness and health throughout the establishment, people say: "If I only lived in the country, but the demands of city life are so different." True, the ill-advised conveniences and false notions of city life demand many victims to care and disease, but if a method of furnishing which will advance the sanitary and social condition is of advantage in the country, why is it less desirable in the city where the dangers from disease are greater, and where the demands of fashion and society keep the nerves of the housewife at their utmost tension. How many burdened souls would gladly banish their heavy upholstered furniture and draperies which make sweeping day a domestic *bête noir*, and which the most eternal vigilance cannot save from moth and rust, if they could only be convinced that it was quite the thing to live without these household goods whose possession involves a constant sacrifice of strength and patience. Fashion has removed one more stumbling block in almost entirely abolishing the lambrequin, that mortal enemy to air and sunshine, which, a few years ago, covered more than half the windows like a funeral pall. The rich plush and tapestry draperies now in use may be just as heavy as the monstrosity they have displaced, but they can be moved, and, when pushed back on their rods, allow the entrance of "heaven's remedies, light and air." Better than these, even if less elegant, are thin curtains, not too costly to be exposed to the sunshine. This is a cardinal point in healthful furnishing: Let in the sunlight. If it fades the various inner decorations, replace them; or, if that is too expensive, either select those which will bear the light, or do without them altogether. Nothing, not even the admiring approval of the fashionable world, can compensate for the lack of this mightiest foe to weakness and disease. If some semblance of the lambrequin is desired, a band of stained glass across the top of the upper sash may be as beautiful as art can make it, and costly enough for the most extravagant. The many varieties of thin Madras stuffs make effective curtains. Some of the figured fabrics which come in special designs for windows are exquisitely harmonious in color, combining well with all the popular shades used in furniture. Some of them in their designs and tints have almost the effect of stained glass in their oriental patterns, while some show beautiful conventionalized floral designs. Simpler and less expensive than these, are the striped Madras goods, the thin fabric in its clear colorings of ecru, red and blue, holding its own bravely against the strongest sunlight. Linen bunting, with its bordering of antique lace, has been much in vogue during the last few years, but it is yielding somewhat to the more artistic India fabrics. Figured white muslins are always inexpensive, fresh and pretty, and are found in almost endless variety of patterns. Cheese cloth, which is within reach of the shortest purse, may be used satisfactorily in bedrooms. It is easily kept clean, hangs in soft folds, bears repeated washings, and is infinitely superior to the stiff, unmanageable Holland shades. A new material called Russian grenadine is used with insertions and borderings of Cluny lace. Japanese chintzes which come in ten-yard pieces, show good ground colors with all over designs in gilt, and are among the most inexpensive and effective cotton fabrics. For window shades nothing is more attractive than those of Japanese manufacture, of narrow split bamboo, fastened together with threads, like the old-fashioned Venetian blinds. They are light, thin and pliable, and have a great variety of decoration in color. A very thin silk, in light plain colors, with a bold design embroidered in outline, is used where shades are desired, and is especially good for vestibule windows, or for the glass panels of outside doors.

* * *

R. W. Bates has at his rooms on Adams street the designs and draperies for a room which he is finishing for one of the most elegant private residences in this city. The design is Persian, and is carried out clearly and harmoniously in the minutest details of woodwork and furnishings. The wainscoting, ceiling and other woodwork are of San Domingo mahogany, which takes a high polish and is of a deep yellow

color, growing dark and rich with age. The upright piano which stands between the windows shows the pure Persian design in the fretwork of the sides, and the sitting lions which support the keyboard. Cabinets and desks repeat the design in their arches and lattice work. In the panels are clusters of pansies in the natural forms, exquisitely carved, and these flowers appear in the panels of the furniture and mantel, in the triangular spaces of the deep wainscoting and in the freize. The ceiling shows a geometrical design with the lines and flowers in relief, the pansies here being illuminated in the natural shades of purple, white and gold. From the ceiling hang twelve lamps of perforated brass, which were brought from Persia, and which are, after the fashion of that country, suspended by brass chains at different heights. These lamps are of a very elaborate design and workmanship, each one having an individual pattern. A rich carpet of an original design is now in the loom at the manufactory at Glasgow. It is to be woven in one piece to cover the entire floor, and will have the colors of gens d'armes blue, fawn and dull red admirably combined. Two porcelain plaques, painted in Paris by Boulanger, are to be set in the piano front. They show, on a gold ground, the figures of a Persian warrior, and a beautiful woman in the picturesque costume of the same country. A similar plaque in the woodwork of the mantel has a figure of a dark-eyed beauty drawing the folds of a veil of pale blue gauze across her face. The tiles for the mantel facing, which were made in New York, show Persian figures and architecture, very spirited in design and good in color The wall space is painted in oil colors in shades of fawn and gold with a lattice pattern and rosettes. The curtains are of heavy silk chenille, with bright figures on a fawn background, finished with a band of blue plush which has a decoration in lattice work of silk gimp. The furniture coverings are of gens d'armes blue plush, with an applied pansy design on the backs of the chairs and sofas. The doors of the cabinets are of jeweled stained glass. The entire work is done in Mr. Bates' establishment and the Persian motive runs through the whole, making a pure, unmixed design which is a pleasing novelty in these days when Queen Anne furniture, Pompeian wall decoration, modern carpets and Japanese cabinets, or combinations equally incongruous, so often stare each other out of countenance in the same apartment.

* * *

The new wall papers appear in lighter colors than those of last year, and the olive grounds which in many cases were dull and dark, have yielded to the lighter shades of yellow. The most popular colors in the new papers are shrimp pink, crushed strawberry, terra cotta, turquoise blue, Nile blue, and the gold and cream shades. These are the same tints which are shown in the new cotton dress fabrics, and they indicate a very pleasing reaction from the dull, æsthetic colorings which suggested washed-out, faded effects, without the restfulness of good neutral tones. In drawing-room papers, especially, the lighter colors predominate, and this indication that the reign of gloomy dignity in decoration and furnishings is at an end, is very cheering. The designs shown are flowing and graceful and, whether conventionalized or natural forms are used, they are not the set and formal patterns of a few years ago, which so readily formed themselves into figures and spots that would insist on being counted over and over again until they became a weariness to the eye and brain. Papers of medium cost seem to be in demand, their excellent colors and designs making them desirable, while their moderate price renders possible the frequent renewing which health and cleanliness demand. Some of the more inexpensive wall papers are very good. A certain room whose walls are covered with a paper which cost 25 cents a roll, has a Morris design and shows on a background of light warm olive, a conventionalized pattern of flowers, in olives. reds and black, with a dash of yellow. This paper lights up with rare effect, and is as much a thing of beauty, and as great a source of pleasure to those who see it every day as though it cost twenty times its modest price. Care in selection will work wonders, while the most costly materials, ignorantly purchased and applied, will only make the dreariness of an ill-furnished house more emphatic. Among the more elaborate and expensive designs in wall papers at the store of Spoor Mackey are some flock papers in exquisite shades, with artistic hand-painted floral designs. These are used almost exclusively for ceilings and frieze decoration, and show natural forms, exquisite in arrangement and color. A paper intended for the ceiling is of turquoise blue, with great sprays of crimson and amber-tinted roses, the full, heavy blossoms repeating admirably the richness and beauty of nature, and with here and there a brilliant tropical bird. The combination of colors in the decoration and background is very harmonious. A section of a frieze has a trailing spray of wild roses with a bird, and two yellow butterflies on a ground of soft ecru inclining to brown. A paper of the same shade bears, on its rich, velvety surface, stalks of wheat, cornflowers and roses, the beautiful field blooms being excellent in grouping and color. A gold paper makes an effective background for tall stalks of red lilies, with roses, and butterflies poising above the flowers. These papers have many advantages over designs painted directly on the wall surface, and are used when natural forms in free, bold designs, as well as artistic beauty and finish, are desired.

* * *

In Sardou's new play, Fedora, which now occupies the stage of the Vaudeville, in Paris, there are three different drawing-room scenes. One is a Louis XVI salon, one a rococo salon and another a conservatory salon. The walls and ceilings of the third room are of elaborate white and gold trellis work ; the windows and doors are of Moorish or Byzantine design, with curtains and portieres of Karamanian carpets. The ceiling is decorated with sprays of natural flowers. The furniture is upholstered in pale rose plush and lampas. Under the shade of some fine palm trees is a couch covered with white bearskin, the head forming the elbow.

* * *

The material known as lincrusta Walton, which has been quite extensively used in wall decoration, has been heretofore manufactured abroad. Recently a stock company has been formed, in which a number of Chicago business men are interested, and a manufactory is to be established in New Jersey. The lincrusta can be worked in elaborate designs, and takes the gold, bronze and copper tints with excellent effect, its rough surface giving a fine play of light. But there seems a possibility that it may be put to the baser uses of decoration in restaurants, steamboats and cars, so that it may become of less value for use in private houses.

* * *

An effective material for dadoes and wainscoting is a composition known as solid relief, which is an excellent imitation of stamped leather. It is seen in floral and fruit designs, an excellent one being a grapevine pattern with leaves and grapes in shades of gold and bronze. It is also finished, though at greater expense, in the natural colors.

A new style of window shade lately placed in Queen Victoria's apartments at Balmoral promises to become generally popular. It is of openwork embroidery on fine linen, lined with colored silk, the bright color showing through the open spaces of the needlework, and is elegant and effective.

Bronze is replacing brass to some extent for purposes of ornamentation. Some of the work is very fine, reproducing the antique designs and colors admirably.

THE PREVENTION OF DIPHTHERIA.

The Illinois State Board of Health has issued Nos. 2, 3 and 4 of its "Preventable Disease Circulars," relating, respectively, to the prevention and control of diphtheria, scarlet fever and typhoid fever. They should be in the hands of every householder and physician, and can be had on application to the board at Springfield. There ought to be a greater interest manifested than there is in the suppression of diphtheria, which, "during 1880, caused 51.33 out of every 1,000 deaths from all causes in the United States," and nearly that proportion in Illinois during the past year; but, as one of these circulars states, "because diphtheria finds the majority of its victims amongst children, there is not the same attention given to precautions against its spread as there is, for example, in the case of small-pox. And yet, there is every reason to believe that —aside from the specific measure of vaccinal protection—the spread of diphtheria may be as effectually controlled by a scrupulous observance of proper precautions." The following directions are given for its prevention :

1. If one is subject to catarrh, or inflammatory affections of the throat, especial care should be paid to the condition of the general health and to the general hygienic surroundings. There is reason to believe that diphtheria originates spontaneously in such persons when the system is debilitated from any cause.

2. During the existence of diphtheria, avoid crowded gatherings in badly ventilated rooms, as in theaters, public halls, and even churches. This is of especial importance during cold weather.

3. Secure thorough ventilation and perfect cleanliness of nurseries, kinder gartens, school-rooms and other places where children are cared for. Parents should make it their personal business to secure these in the home and nursery, and to see that those in charge of schools, etc., are also mindful of these important matters. Children are more subject to diphtheria than adults, and the disease is more fatal with them ; hence the necessity of these precautions on their behalf.

4. During the existence of a case of diphtheria in the neighborhood do not neglect any soreness of the throat, however slight, until assured of its harmless nature by the family physician.

5. Unless absolutely necessary, do not come in contact with, or inhale the breath of, one sick with sore throat. Avoid kissing, or eating and drinking in common with such sick person.

6. Diphtheria has so often appeared where uncleanly conditions have prevailed, when it could not be traced to continuous propagation by contagion, that its relation to filth as a cause may be assumed for sanitary purposes. It is immaterial whether the filth exists in visible and disgusting forms, such as the garbage heap, the cesspool or the privy-vault, or in the invisible and possibly inodorous gases from an ill-constructed sewer; from decaying vegetables in the cellar, or in the poisonous exhalations from the human breath and body in unventilated rooms. All these undoubted causes of ill-health should be at once abated.

7. Because of the fact stated in No. 3, an adult may venture, when necessary, to come in contact with a case of diphtheria ; but no child should ever be so exposed, either directly or indirectly. Adults who are compelled to visit such cases should take the precaution to bathe and change clothing before going near a child. Children should be prevented from entering the water-closet or privy into which diphtheria discharges are thrown, even after disinfection. In short, they should be removed at once and definitely from any possibility of contagion during the existence of a case.

8. Cats, dogs, cows, swine, and some other of the lower animals are known to be subject to diphtheria, and fatal cases among human beings have been contracted from them. Avoid, therefore, having anything to do with a cat, dog, cow, hog, or other animal suffering from any throat disease, until it is known not to be diphtheria.

9. Outbreaks of diphtheria have been traced to the carriage of the contagion by the wind. Therefore it is advisable to close the windows and doors, and avoid as much as possible the side of a house towards a known infected house or locality, especially during the prevalence of high winds from that direction.

10. There are no specifics or antidotes for diphtheria. The resort to such can do no possible good, and may lead to harm.

CORRESPONDENCE.

FOLLOWING A GOOD EXAMPLE.

OFFICE OF THE BOARD OF HEALTH,
GRAND RAPIDS, Mich., Feb. 22, 1883.

TO THE EDITOR OF THE SANITARY NEWS: I am pleased to learn from your valuable paper of February 1 that the placarding of all houses infected with any contagious disease has not proved a failure in Chicago. In September, 1882, we caused an ordinance to be passed here to compel the occupants of any house wherein there was any person ill from any contagious disease (small-pox, diphtheria or scarlet fever) to put up and maintain a card in a conspicuous place on the front part of the house wherein the infected person may be, such card to be furnished by the Board of Health and to have plainly printed thereon the name of the disease from which the person is ill. At first we met with much opposition, but such opposition has died out as people became educated up to the benefits derived, and to-day we count among the warmest friends of the placarding system those who at first most strongly opposed it. As a result of the placarding we have a large reduction of cases of diphtheria and scarlet fever. I would earnestly recommend that all local boards of health give the matter a trial. Yours, etc.,

GEO. A. LOVE,
Secretary Board of Health.

CURRENT PUBLICATIONS.

"SCIENCE."

This new scientific journal, announced some time ago, came into the world February 9. It has about the same modest yet prepossessing appearance as *Nature*, after which it seems to have been modeled, and of which it bids fair to become a prominent rival. Typographically, it is much more attractive than the London publication. It is intended for scientific men and the educated public and will be devoted to the advancement of knowledge and scientific research in America. It claims to have secured in advance the good-will and active support of a large body of the most competent scientific men of the country. It will be published weekly and each issue will contain "at least twenty-six large octavo pages of reading matter," which will be illustrated liberally. Moses King is publisher, and S. H. Scudder editor. The subscription price is $5 a year.

"THE POPULAR SCIENCE MONTHLY."

In the March number of *The Popular Science Monthly* Dr. Joseph Parrish discusses the "Evolution of the Camp Meeting," in which he finds that it is not, as it used to be, "an extemporaneous festival in which the membership of one or more churches take the lead, select a place of meeting and invite the neighboring churches to participate in a common service," all separating when the service is ended, but rather "the fruit of a chartered association, with corporate rights and franchises, of the same nature as those which belong to banking and railroad associations." Sanitary matters, as related to this primitive life in the woods, as unnatural as unsanitary, receive his attention. An article on "Sewage at the Sea-Side" complements this by exposing the unsanitary condition of most sea-side resorts. The other articles are usually entertaining and instructive.

PERIODICALS RECEIVED.

"Science," Cambridge, Mass.; "The Continent," Philadelphia, 'Popular Science Monthly," D. Appleton & Co., New York; "Building," Wm. T. Comstock, New York; "The Sanitarian," New York; "The Builders' Weekly Reporter," London, England; "Gazette des Architectes," Paris, France; "The Modern Age," Buffalo, N. Y. "The American Architect," James R. Osgood & Co., Boston; "Scientific American," Munn & Co., New York; "The New York Medical Journal," D. Appleton & Co., New York; "Medical News," Henry C. Lea's Sons, Philadelphia; "The Medical Record," Wm. Wood & Co. New York; "The Medical and Surgical Reporter," Philadelphia; "Eclectic Medical Journal," St. Louis; "Engineering News," New York; "The California Architect," San Francisco; "The Manufacturer and Builder," New York.

BUILDING INTELLIGENCE.

A six-story structure, 25x125 feet in size, fronting on Washington place, just west of the Union Club house, is projected, as a bachelor apartment house for members of the Club. The first floor will be devoted to a restaurant and the upper floors to suites of rooms. The latter will be finished in hard wood and elegantly decorated and furnished. The Union Club will also erect a six-story apartment house on a lot owned by it, fronting on Dearborn avenue.

Plans for a new building for the Union Riding Club on North Clark street, between Goethe and Schiller, are being prepared by Architects Cudell & Blumenthall. It will be 72x150 feet in size and cost $22,000.

Mr. William N. Linn is building a house on Michigan avenue, designed by Architects Burnham & Root, of green stone laid rough, wood gable, panels of terra cotta, round tower with copper roof, and the dimensions 40x70 feet.

The four-story stone front Weber building at the southwest corner of Indiana and Clark streets is being reconstructed and remodeled. It was recently sold for $60,000.

A four-story brick and stone building to be occupied by commission firms, will soon be erected at the corner of Dearborn and South Water streets by Porter Brothers.

Mr. Charles Linderman will build a two-story brick residence at the corner of Diversey and Halsted streets, Lake View, to cost $6,000.

CORRECTION—Cudell's trap, an illustration of which was given on page 93 of THE SANITARY NEWS, was incorrectly designated as the Climax trap.

DEATHS.

Annual Report of Deaths from Throat and Lung Diseases in Chicago for the Past Year, with Practical Observations on the Causes of Failure and their Proper Treatment.

[*From the Chicago Tribune, Feb. 1.*]

For the past thirty years it has been my invariable rule to publish an annual report of the mortality caused by the diseases embraced in my specialty, with such observations regarding their nature and treatment as seemed to me pertinent and of importance to the general public.

The records of the Board of Health show that there were 4,017 deaths from this class of diseases in the last year, which is considerably more than *one-fourth* of the gross mortality from all causes—including deaths by accident, violence, and still-born children. By separating these latter as not indicating perils to health by disease, it will be found that more than *one-third* of all deaths by disease result from the unsuccessful treatment of throat and lung complaints.

Bronchitis—This affection destroyed 463. It is a local disease of the air tubes of the lungs. It begins as a cold, which settles on the mucous membrane lining the tubes, and passes rapidly into inflammation. Before death ensues it has generally spread over the entire lungs, but at the early stage is confined to the larger tubes. It may terminate fatally in the acute form within two or three weeks from the commencement of the attack, but more commonly runs into *chronic bronchitis*, in which case the patient lingers on for months or years, and dies with all the symptoms of consumption.

Pneumonia—This malady destroyed 844 lives. It is an acute inflammation of the whole structure of the part of the lungs in which situated. It may affect both lungs, but commonly falls upon only one, and is generally confined to the *lower lobes* and *smaller tubes*, whereas bronchitis first attacks the *upper lobes* and *larger tubes*. The duration of pneumonia is from one to three or four weeks, within which time it either terminates in recovery or death. It very seldom becomes chronic.

Congestion of the Lungs—In the health office are 109 certificates of death from this cause. Congestion is not properly a disease. It is simply a rush of blood to a part, producing engorgement of the blood-vessels. When it is so great as to utterly overwhelm the lungs and cause sudden death by stopping their action the proper name is *pulmonary apoplexy*. It is similar in effect to a rush of blood to the brain, causing sudden death by stopping the action of that organ. Ordinarily congestion is the first stage of inflammation, and almost every case of bronchitis and pneumonia begins in congestion of the lungs produced by cold.

Consumption—The deaths from this disease were 1,066, which is a considerable increase over previous years. Consumption is essentially different from bronchitis and pneumonia in that it arises from a specific cause as distinct and definite as the cause of small pox or cholera. The lungs are destroyed by the growth and suppuration of little granular bodies called tubercles. These tubercles are produced by parasites, which fasten upon the denuded mucous membrane, gradually undermining the function and destroying the vitality of the lungs. They are derived from the air, but have no power to injure healthy lungs, because the mucous lining of the air passages is then shielded by the epithelium, a thin covering which guards all mucous membranes from whatever is hurtful in the air. Whenever this protection is removed by abrasion or by catarrhal or inflammatory disease, they fasten upon the raw surface and begin their destructive work. It is only in this way that colds, catarrh and bronchial diseases lead to consumption. They open the door for the specific germs of consumption to enter, without which it could not occur. A softened mass of tubercular matter examined under a sufficiently powerful microscope, is found teeming with living organisms. A simple drop of this matter will produce consumption if inoculated into any healthy animal. Even the breath of a consumptive in the ulcerative stage is capable of infecting any person having catarrh or chronic bronchitis.

Diphtheria—This, like consumption, is a specific disease, which differs from it only in the kind of parasite which produces it. It is purely local in its origin, but spreads through the blood to the entire body. It is rapid in its progress and very fatal when improperly treated, but under judicious management is one of the most curable diseases of its class. Five hundred and sixty-three deaths by diphtheria are recorded.

Asthma caused thirty-three deaths. This disease is of two kinds—*spasmodic* and *bronchial*. The former comes on suddenly in violent fits or attacks of difficult breathing, and passes off in a few hours, leaving the patient apparently in health. The latter is a chronic bronchitis subject to sudden attacks of congestion with mucus obstruction of the air tubes. Every accession of cold is liable to end in an attack. In many the oppression comes on regularly every night or towards morning. There is always more or less cough and mucus expectoration in this form of asthma, even when the lungs are comparatively free.

By these five diseases 3,078 persons lost their lives in the last year, and 939 by other throat and chest complaints.

It is impossible to contemplate this frightful sacrifice of life occurring year after year from one class of diseases without arriving at the conclusion that there must be something radically wrong in the general treatment of such disease. Many of these diseases are simple and easily cured by proper treatment, and none of them are incurable, except such as are rendered so by long-continued neglect and injudicious medical management in the early stages.

The cause to which I attribute the bad success of physicians in their treatment of throat and lung cases is that they combat effects and overlook the cause; they treat symptoms and neglect the morbid condition which produces those symptoms; they apply their remedies to the stomach, which is not affected, instead of the air-tubes and cells of the lungs, where the disease is seated. Under inhalation, most cases of lung diseases are promptly arrested, and, if treated in the early stages, easily cured. In the past year I treated in this way 562 cases, embracing every form of bronchitis, pneumonia, asthma and consumption, and had but seven deaths—a fact which can be verified by examining the certificates in the health office. In my whole practice in Chicago for the past ten years not one case of bronchitis, pneumonia, congestion of the lungs or asthma has ended fatally, and but one case of diphtheria, out of hundreds of cases treated each year. It is a significant fact that, while general physicians in this country are wholly without knowledge or experience of the action and efficacy of inhaled remedies, and do not employ inhalation in their treatment of lung cases, in every other civilized country and in all European hospitals for the special treatment of these diseases it is relied upon as the best, and indeed the only effective, means of cure.

Consumption, when treated by inhalation, is more manageable than many other forms of chronic disease for which medical science affords a remedy, but it is not curable by medicines taken by the stomach in any form or stage of its progress, and the same is true of bronchitis and asthma. Every case so treated must go on from bad to worse. Death occurring under such a course is a natural result, and is the penalty which ignorant credulity pays to malpractice. The fearful death-roll of throat and lung diseases published each year in the annual report of the Board of Health is enough to cause people to pause and reflect whether the time has not arrived for the establishment of an institution for their special treatment by medical inhalation.

ROBERT HUNTER, M. D.

103 State street, Jan. 25.

THE SANITARY NEWS.

BY G. P. BROWN.

ITS MISSION.

THE SANITARY NEWS is devoted to all that relates to healthy homes and healthy living, and is thus a journal for the people as well as for the trades and professions. It gives special attention to the architecture, construction, lighting, heating, ventilating, sewerage, furnishing and interior decoration of a building; city and country drainage, water and food supply, personal and public hygiene, etc. It is the only journal in the West devoted to Sanitary Science; in view of the wide field it has to work in and the increasing interest in sanitary scientific subjects, together with its present success, its future is most promising. The endeavor to make a paper which shall have artistic as well as literary and scientific merit, has met with encouraging approval, and no pains will be spared to keep it up to the present high standard, editorially and mechanically. The paper has already proved its value to its advertisers, among whom, it is a pleasure to state, will be found representative men in their specialties. THE SANITARY NEWS has already a large and increasing circulation, extending through nearly every State in the Union. It has received words of the highest commendation from every source.

ITS REPUTATION.

The following are extracts from a few of the published opinions of the press and commendations from men of reputation in personal letters:

We see every promise in the two numbers of this journal which have reached us that it will be found among those which have the best right to a long and useful career.—*American Architect and Building News.*

Chicago and the West offer a wide field for sanitary effort, and we wish our contemporary every success in the working of it.—*The Sanitary Engineer.*

We trust it may win a host of friends, as it most certainly will, if succeeding issues are kept up to the high level of No. 1.—*The Michigan School Moderator.*

THE SANITARY NEWS is a bright, well-printed semi-monthly just started at Chicago, which is doing good work in a neglected field.—*The Philadelphia Press.*

Every family in the land ought to take some publication devoted to sanitary matters, and this Western journal is equal to the best.—*The Flint Globe.*

"I am a constant reader of THE SANITARY NEWS, and like your paper very much indeed."—*Wm. Paul Gerhard, Civil and Sanitary Engineer, Newport, R. I.*

"The journal, if I may judge from the numbers I have seen, is worthy the support of all interested in sanitary matters, and this ought to include all mankind."—*J. T. Reeve, M. D., Secretary of the Wisconsin State Board of Health.*

"I am glad to see such a well-chosen and well-digested presentation of sanitary intelligence here in the Northwest. The large amount of original and editorial matter is a sufficient proof of force in the undertaking and must be appreciated."—*Professor A. B. Prescott, Professor of Applied Chemistry in the University of Michigan.*

It is neatly printed and presents a valuable list of contents.—*The American Artisan.*

The West has now a good commentary on these important matters.—*Newport* (R. I.) *Daily News.*

The first number is bright, varied, sensible in matter and of handsome appearance.—*The Chicago Times.*

The first number is exceedingly creditable, both as relates to the appearance of the issue and the matter contained therein.—*Industrial World.*

THE SANITARY NEWS.

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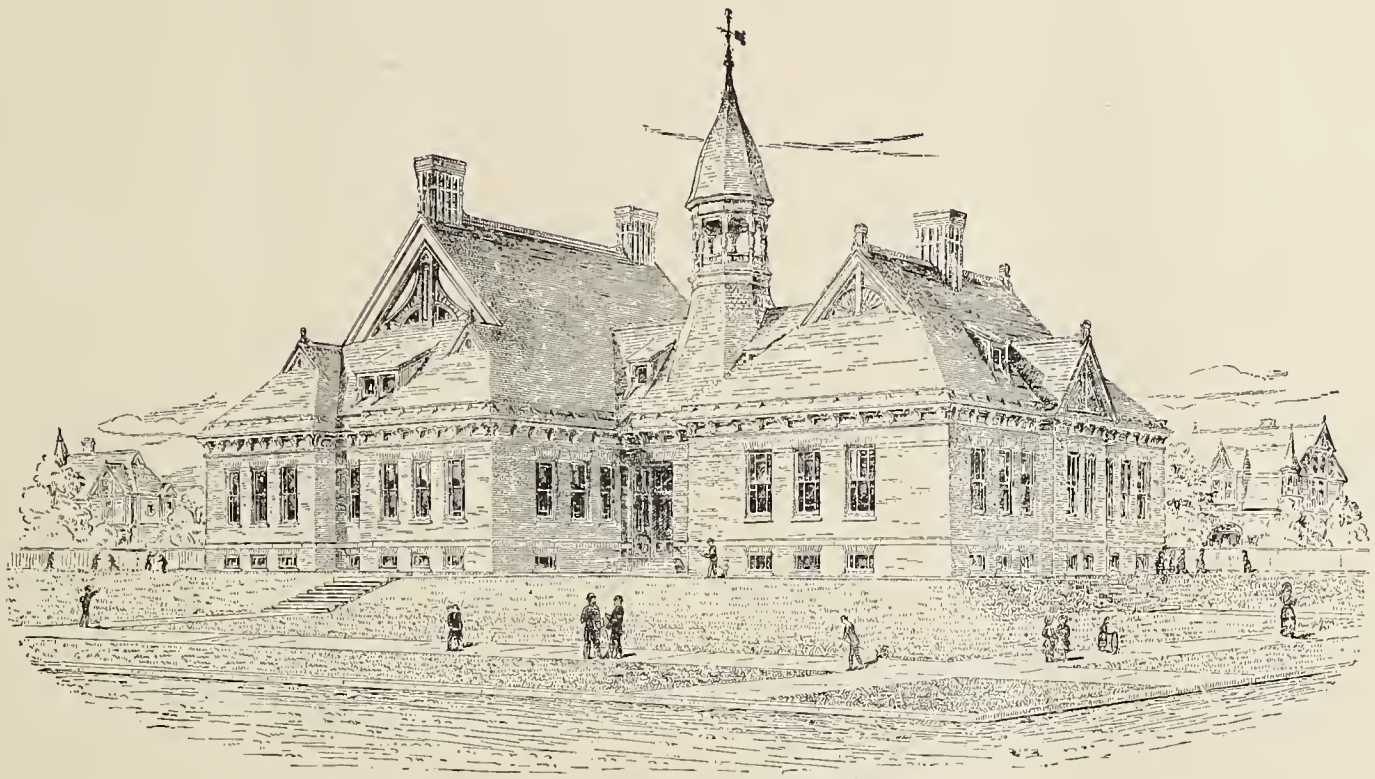


PUBLIC SCHOOL BUILDING EVANSTON ILL.
EDBROOKE & BURNHAM ARCHTS CHICAGO & DENVER.

IT is little more than four months since THE SANITARY NEWS came into existence. The success which it has already attained is indicated in the improvement it is now enabled to make in its appearance, size and contents. Extra pages have been added to accommodate the increasing advertising, and there have been some changes in the arrangement of matter, style of headlines, etc., which help to make the paper more attractive in appearance. Most important of all it is now printed from new type, made expressly for the use of THE SANITARY NEWS; the letter is of the old style, one which has never been equaled by any modern design, and doubtless never will be, in its artistic merits; the eye never wearies reading from it. Hereafter, the pages will be electrotyped, and there will be no trouble about supplying all copies that may be called for. Unfortunately, in one sense, though really most gratifying and encouraging, the early editions of THE SANITARY NEWS have been entirely exhausted, with the exception of a few copies which must be preserved for binding at the end of the year—exhausted because the demand was much greater than had been expected, and notwithstanding large editions were issued. There will be none of this misfortune in the future. No paper published, probably, presents an appearance typographically equal to that of THE SANITARY NEWS; certainly there is none that looks better. This is due largely to the fact that the best paper is used, but still more largely to the careful printing, by the largest and best-equipped house in Chicago, that of R. R. Donnelley & Sons—the Lakeside Press. Other changes than those noticed in the present number, in the arrangement of matter and make-up, will be made in succeeding numbers, until an ideal shall have been reached, which would have the most and best of everything exactly in its place. To this end the departments of the paper will be systematically arranged and given definite space and position.

As to the contents of THE SANITARY NEWS, the matter will be the best that can be had. It should be borne in mind that a paper cannot be made in a day and that if it has shortcomings in its early existence, this is inevitable. THE SANITARY NEWS hopes and expects to become a fair exponent of sanitary science, thus proving itself useful, if not a necessity, to every man who helps to build, or lives in, a house; who eats food, breathes air, wears clothes, is sick and might be well—in short, to every living person who reads and can profit by what he reads. THE SANITARY NEWS is the organ of no man nor body of men, and is published in nobody's interest except that of the general public and its proprietor. The latter has no business except that of editing and managing this paper, and expects never to have any other. In its pages everybody will be treated with absolute fairness, so far as it is given to man to decide what is fair. THE SANITARY NEWS will always be ready to assist in any legitimate way to further the interests of those whose trade,

or profession, brings them into relations with its own work. In return it would ask the co-operation of all who are interested, professionally or otherwise, in the advancement of sanitary science. Architects, plumbers, builders, civil and sanitary engineers, manufacturers of and dealers in supplies for those named, and heating and lighting apparatus, food supplies, etc., and health officers, physicians and, indeed, every householder, can assist the paper very much by furnishing it with information, and making it a medium of communication with reference to sanitary matters. A co-operation of this kind is heartily solicited, and THE SANITARY NEWS can thus be helped to become the best paper of its kind in existence.

ATTENTION has been called from time to time to the commendations of THE SANITARY NEWS, which have been unusually flattering and encouraging, the source from which they came being taken into consideration. It is with continued pleasure that the following is found in the pages of *The Continent:* "THE SANITARY NEWS of Chicago, though not much beyond its infancy, gives promise of very vigorous and profitable life. It speaks well for the culture of Chicago that a special journal so well printed and bright should find support there, and its literary tone is high enough to make it very agreeable as well as profitable reading."

AT the last meeting of the Chicago Master Plumbers' Association a committee was appointed to request of THE SANITARY NEWS that it establish at its office a bureau of exchange of information for the mutual benefit of master plumbers and journeymen. As it is now, young men out of employment are compelled to tramp the city over, in going from one shop to another in search of employment. If they could know in the first place who needed help, by referring to a record kept from day to day at some central point, they would be very much aided. A record, also, of those who need employment, kept in the same way, would prove equally valuable to employers, who would thus know where to reach help promptly. THE SANITARY NEWS will undertake, with pleasure, to keep such records, and they will always be accessible at its office on the fifth floor at No. 144 Monroe street. Names and residences, or offices, sent in by mail, will be promptly recorded. In addition to this, as stated in another column, a brief notice will be inserted free for those who desire employment, either in Chicago or elsewhere, with architects, plumbers, civil or sanitary engineers, electric lighting and gas companies, manufacturers of steam and heating apparatus, etc.

BY virtue of authority given by the City Council in an ordinance adopted in 1881, Mayor Harrison cut the wires of the Mutual Union Telegraph Company on March 2 at the city limits, because they had not been laid underground, as ordered. It is also provided that all other wires now stretched on poles shall be put underground by May 1. In consequence, the question of underground telegraphy has been variously discussed within the past two weeks. The latest plan proposed is to construct a conduit of stone or cement, four feet high and three and a half feet wide. Shelves or troughs are to be attached to the sides, having a sufficient capacity to contain wires enough to use for fifty years. In the middle will be room enough to run a hand-car on which a workman can ride. This hand-car will have an attachment for the laying automatically of one or more wires in different shelves at the same time. A circulation of warm air throughout the tube is provided for. The conduit will cost $6,000 a mile. The only insulated underground wire in Chicago now in operation is between the general offices of the Western Indiana Railroad Company, at No. 94 Washington street, and the Twelfth Street depot. This wire has been in operation for six months and successfully. The wires were put into a single lead tube, insulated by smaller glass tubes. The cost was $2,000 a mile. An underground telegraphic connection is now being established between Marseilles and Paris. The cable is enclosed in a cast-iron pipe which is laid nearly six feet below the surface of the ground, and which, at intervals of about 550 yards, is provided with cast-iron boxes. The cost of the whole work will be about $8,000,000.

THE fifth annual meeting of the Sanitary Council of the Mississippi Valley will be held at Jackson, Mississippi, on April 3. Those interested in sanitary matters, especially in the Valley, will recognize the importance of a full attendance at this meeting, and in view of recent action—legislative and judicial—affecting the sanitary interests of territory not embraced in the Council, in common with the Valley proper, invitations have been extended to prominent sanitarians and health officials in the South Atlantic and Gulf States. The Executive Committee hope that such invitations will be generally accepted. Dr. John H. Rauch, Secretary of the Illinois State Board of Health, is Secretary of the Executive Committee.

M. PASTEUR read a paper at the last meeting of the Académie des Sciences which contained an account of the wonderful results achieved by his discovery for inoculating live stock as a preventive against disease. During the past year nearly eighty thousand sheep, between four and five thousand head of cattle and five hundred horses were vaccinated. For the ten years previous the average animal loss from liver-rot in the Department of the Eure-et-Loire was 7,327, or 9 per cent. Since the introduction of vaccination the loss has been reduced to 518, or 66 per cent. Among the flocks which were only partially vaccinated the loss was as 1 to 10 between the vaccinated and unvaccinated. These sheep were brought from different parts of the Department and the vaccinated and unvaccinated were all fed and treated in the same way. Among cattle 4,562 head were vaccinated during the year; there were only eleven deaths, the rate of mortality being thus reduced from 7.03 per cent. a year ago to .24 per cent. Horses were not vaccinated so generally as sheep and cattle, but of 824 subjected to it only three died. All this is considered to prove beyond doubt the efficacy of M. Pasteur's discovery. When its application to the dreaded diseases to which man is subject, in addition to small-pox, proves successful, Pasteur will have become one of the greatest, if not the greatest, benefactor of the human race.

A "Practical Plumber," writing to an Eastern journal thinks that the plumber occupies a somewhat equivocal

position. "He is classed by the general public as a tradesman or mechanic, and, at the same time, a scientific knowledge and practical skill are expected of him that would not disgrace many of those holding scientific and professional rank. This scientific knowledge is not to be acquired in the ordinary way in which trades are learned, and so far no means, or at least very limited means, of acquiring this knowledge are within reach of the ordinary plumber. An attempt is being made to supply this deficiency by the employment of men who have had more or less scientific training, and who call themselves sanitary engineers." The gentleman thinks that these men may have done a great deal of good, both practically and by impressing the public with the necessity of a higher knowledge of their business, yet he thinks that any permanent improvement will be had only when plumbers shall have had a scientific training. He thinks that boards of health might be given the power, and be so constituted as to have the ability, to examine plumbers and give them a certificate of qualification. There might be three grades of certificates—the lowest to be given to those who could pass a verbal examination in the mere handicraft of their business; the second, to such as could, in addition, give the reasons for their practice, and the first, to those who could also draw an intelligible plan and write a specification suitable for the work of any first-class building. While the plan suggested might not be practicable in all its details, it calls attention to the necessity of a more scientific training among plumbers, and indicates a willingness on the part of plumbers themselves to learn the science of their trade. A good plumber must be something more than a machine that knows only how to mend broken pipe, solder a joint and set up a hot-water tank.

The danger of contagion from rags was illustrated a short time ago in a large paper-mill in New Cathcart, Scotland. A number of the work-people were engaged in sorting and cutting rags in the usual way when four of them, in the course of a few days, were seized with small-pox. The rags were consigned from Kœnigsburg, Germany. A form of blood-poisoning among factory people is also known in Yorkshire, which has come to be known as the "wool-sorter's disease." The germs are introduced in bales of mohair which come from certain localities in the East where the people are notorious for their utter disregard of all sanitary precautions and regulations. The mortality among those attacked by the "wool-sorter's disease" is said to be very high, and death ensues with a suddenness which is appalling.

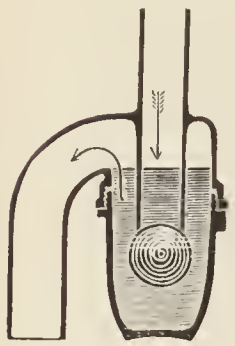
The city of Antwerp, with a population of 200,000, and the third largest port in Europe, previous to 1879 obtained its water from shallow wells and open canals. The sewerage arrangements were imperfect, and the water, though clear, bright and sparkling, was dangerously contaminated. Finally, it was decided to take the water supply from the river Nethe, at a point eleven miles from the city. But the river water was unfit to use in its natural state, and two immense filters were provided. The first filter was placed on a higher level than the second and was filled with a bed of spongy iron and gravel, mixed in the proportion of one to three, covered with a layer of ordinary filter sand, the office of which was to separate the grosser suspended matter. The oxide of iron, with which the water becomes charged in passing through the first filter is removed by the second, an ordinary sand, filter. There are really three of the spongy-iron filters having an aggregate area of more than 31,000 square feet, and three sand filters of the same area. The filtered water is stored in two cast-iron tanks having a capacity of 340,000 gallons. After working eighteen months the result is said to be most satisfactory, the water having remained pure, as well as bright and clear. The spongy iron has not shown any signs of deterioration or wasting, and Dr. Frankland, who has visited the works, reports very favorably of the process employed, not only with respect to the chemical condition of the water, but also with reference to the complete destruction of bacteria and their germs.

Small-pox is on the increase in New Orleans. During the week ending February 24 there were forty deaths from the disease, thirty of which were among colored people. The total number of deaths from the first of January to that date was 187, the colored people being the victims in the same proportion. This great mortality among the latter is due principally to the fact that they are not generally vaccinated. The population of New Orleans is about 220,000, one-fourth of which is colored. Of these, it is said that at least 15,000 are not vaccinated. Unfortunately, it has been enacted by the State Legislature that vaccination shall not be made compulsory, the State Board of Health being authorized only to "encourage vaccination" and to furnish vaccine matter to the sanitary inspectors within the parish of Orleans. The colored people seem to have a prejudice against vaccination, as the newly-arrived immigrants in this city seem to have. In Chicago these people can be vaccinated and their lives saved, willing or unwilling; in New Orleans, the authorities find it necessary to resort to persuasion. A meeting of the Executive Committee of the New Orleans Auxiliary Sanitary Association was held a few days ago, to which the ministers of the various colored congregations of the city were invited. Exhaustive arguments were laid before them relative to the efficiency of vaccination, and they consented to present the matter to their congregations. Dr. Newman stated that the colored man is more readily attacked with small-pox than the white, the mixed, or mulatto, enjoying an immunity in proportion as he is removed from the Hametic race. Although the fact is not established it is probably true that the greater disregard of sanitary precautions among these people, than among those who are farther advanced in civilization, accounts for this susceptibility to the dreaded disease.

J. E. Nagle, in special correspondence to *The Chicago Tribune*, from New Orleans, which is plainly intended to discourage any attempt to construct a sewerage system for that city, sums up what he denominates the "objections" to it as follows: "If sewage is confined as proposed and disposed of in pipes and reservoirs, the concentration of sewer-gas will become a very dangerous and poisonous element in the houses of the city." He prefers open sewage canals running through the streets, and maintains that those in use now are not offensive nor dangerous.

HOUSE DRAINAGE AS IT IS.

IV.



BOWER'S TRAP.

It is not always the fault of workmanship that drainage is defective. The drains themselves may be cracked, broken, ill-shaped, or made of such poor material that they are not at all adapted to the work for which they were intended. In such case the owner of a building, or the man who represents him, is quite as much to be blamed as the drain-layer. While it may be urged that the latter should understand his business sufficiently well to reject defective pipe, it may be answered that he does not by any means have the privilege of acting upon his own judgment. Where the majority of houses are built to rent, and so long as those who occupy them are satisfied with a house because it looks well above ground, it is inevitable that poor material will be put into drains. Pipes that are twisted, irregular in size, cracked, or imperfectly glazed, can be purchased cheap. It is also true that old drains, which have been in use for many years, and are half broken when taken up, are resold and find their way into the ground a second time, to do service, it is likely, at the best houses. The accompanying cut shows how such

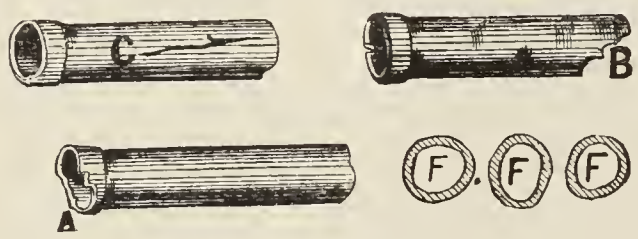


FIG. 1.—BROKEN DRAINS.

pipes look. C shows a section cracked nearly from end to end. A and B indicate broken ends. It would be absolutely impossible to make a good drain with such pipe. The sections F F F show how irregularly-shaped pipes—spoiled in the baking—look. It would be next to impossible to make good joints with such ends. Wm. Paul Gerhard says, in his work on "House Drainage and Sanitary Plumbing": "Neither brick channels nor wooden conduits should be used as house drains. Only strong, hard, well-burnt, vitrified pipe, free from cracks or other defects, should be used. Four-inch pipes and those of smaller size are especially liable to warping, and should be carefully inspected and selected. The interior of these pipes should be well-glazed and smooth throughout; the pipes should be impervious, true in section, perfectly straight, and of a uniform thickness of one-half to five-eighths of an inch; six-inch pipes, eleven-sixteenths of an inch to three-fourths of an inch; nine-inch pipes should be not less than three-fourths of an inch thick; twelve-inch pipes should be one inch thick; fifteen-inch pipe, one and one-fourth inches, and eighteen-inch pipe should have a thickness of one and one-half inches. The joints of the pipes should receive particular attention. The danger arising from imperfect or leaky joints is two-fold, namely, first, the sewage, by soaking into the ground, pollutes the soil and endangers the purity of the water-supply in places where houses are dependent on wells and cisterns for water. The ground around and under the house is more and more subject to contamination, and in winter time, when there is a strong inward draft into houses from fire-places and stoves, the tainted ground-air is thus sucked into our very living and sleeping-rooms, often producing severe illness. The second danger arising from leaky joints is equally patent. The solid matters, carried in suspension in the pipes, are deprived of a part of their liquid carrier, and thus tend to accumulate and form deposits in the house drain, which deposits soon undergo decomposition and fill the drains and pipes with noxious gases.

"Vitrified pipes are made either with a socket or hub attached to one end of the pipe, or with both ends plain. When socket pipe is used, especial grooves should be cut in the bottom of the trench for the hub, in order to give the pipe a solid bearing on its entire length. The pipes are laid with the socket pointing up-grade, the plain or spigot end of one pipe being inserted into the socket of the next. Spigot and socket ends should be concentric. Into the annular space between both a gasket of picked oakum is introduced and firmly rammed by a hand-iron. The remainder of the space is then filled with pure cement, or cement mixed with an equal volume of sand. No lime should be used with the mortar, which should be prepared only in small quantities at a time, to prevent its settling before use. Particular attention should be given to the bottom part of the joint, where the mortar should be pressed into it with the fingers. If water accumulates in the trench, this should be carefully removed from the grooves before making the joints, and sufficient earth should be thrown into the groove to support the mortar at the bottom of the joint, until it has had time to harden. The gasket of oakum prevents any cement from projecting into the inside of the drain, and renders the use of a rattan and rag, with which to wipe the inside of joints, unnecessary. Where the sockets are insufficient in length to permit the use of a gasket, it becomes important to clean the joints of cement projecting at the inside, but in this case a better device than a rattan with a rag tied to it is a strong handle to which is attached a semi-circular disc of wood, of a somewhat smaller radius than the radius of the pipe. The cylindrical pipe without sockets is preferred by some. The joints in this case are made by butting two pipes together and covering them with rings or collars of unglazed terra cotta, applying cement to the inside of the collar and to the ends of the pipes."

But it is not the purpose of this article to show how drains should be laid; that question will come up hereafter. The object is to show in plain language and by illustrations the parts and defects in house drainage, just as it is found in the ordinary house. House drainage and plumbing will never be properly attended to until the house-holder himself "posts up" on these matters; and it is for his benefit, especially, that these articles are written. It may be urged that no trouble should be borrowed over leaking drains, as they are underground; but the earth can not absorb sewage indefinitely, and it is a mistake to suppose that impurities are removed by alleged filtration.

The street sewer is usually shut off from the house drains, so far as any gaseous communication is concerned, by a trap, such as is shown in Figure 2 at X. S is the soil-pipe, and T an S trap under the water-closet W. C D is a drain from a catch-basin, or some fixture within the house. While this trap prevents the return of poisonous gases from the sewer

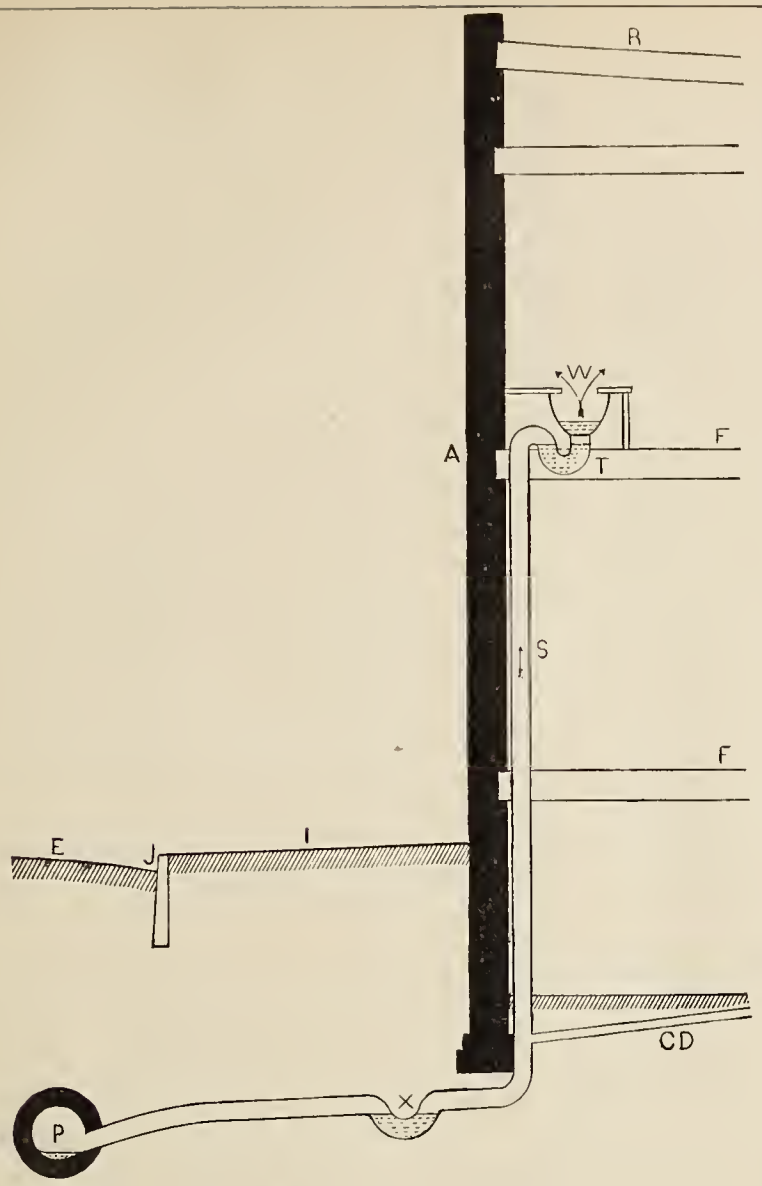


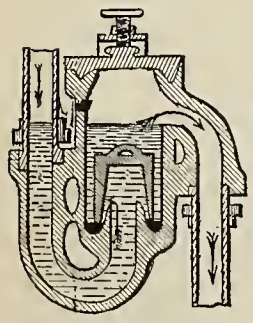
FIG. 2.—A RUNNING TRAP.

it can have nothing to do with the escape of the foul air which is found at all times in the soil-pipes and house drains. The arrows issuing from the water-closet may be taken as indicating the escape of gases generated in the water-closet itself, or which have forced their way through the S trap by displacing the water; indeed, it is claimed that a sufficient amount of these gases, or the germs of disease, may be absorbed by the water of the trap on one side and given off on the other, to do considerable harm. The insertion of the running trap in the main drain was one step in advance in perfecting house drainage, but it was only a step. The illustration here given shows an improvement upon the system indicated on page 76 of THE SANITARY NEWS; but there are still other and far more effective improvements to be noted.

DANGERS IN DIRT.*

BY J. H. KELLOGG, M.D.

I.



NICHOLSON'S MERCURY SEAL.

Is dirt an enemy or a friend to the race, or is it indifferent in its properties in relation to human kind?

Different observers will answer the question in different ways, according as the standpoint from which their observations have been made is a broad or a narrow one. One will assert that according to his experience dirt is the prolific mother of a myriad of disorders, the prime cause of such diseases as diphtheria, scarlet fever, typhus, typhoid and malarial fevers, cholera, yellow fever, and even small-pox. Another will assert that according to his observation the grossest neglect of the requirements of cleanliness and the simplest sanitary rules is compatible with the highest health. Still another sees in filth only the predisposing cause of grave maladies. Who is right? Or are all right and all wrong?

Even a cursory glance at the progress of civilization will be sufficient to settle this question. When did deadly plagues devastate the earth, depopulating the large cities, and spreading consternation over the world? Was it not when mankind had not yet learned the deadly nature of filth, and looked to an angry Deity as the cause of their woes, whom they sought to appease by sacrificing their children, as was done at Carthage a few centuries before the present era? Nearly two thousand years later the Pope of Rome knew no better way of opposing the ravages of the plague than the issuing of a bull of excommunication in which he anathematized alike the plague, the Turk, and the comet. Some little knowledge of sanitary laws appears to have been possessed by both the Greek and Roman nations at the period of their greatest enlightenment; but the Jews were the only nation who seem to have approached at all closely to the requirements of scientific sanitation. Through their lawgiver, Moses, they received a code of sanitary rules which, in some respects, have never been excelled in any country at any period, not excepting the present enlightened age. Indeed, in the body of rules formulated for his people by Moses we find the foundation for all subsequent sanitary legislation. To their obedience to these rules may be attributed the exceptional longevity of the Jewish nation, which is so noticeable in all countries, under the most diverse conditions of climate and social condition, a broken, wandering, outcast nation, yet possessing such wondrous vitality as to be able to outvie its competitors in the race of years in every part of the habitable globe. I would here incidentally take occasion to recommend some portion of the sacred book as a most excellent treatise on sanitary science. I know of some very good suggestions to be found within its pages respecting diet, rest, exercise, etc., as well as in relation to cleanliness.

A historian tells us that for a thousand years during the middle ages, the bath was not known in Europe; and that article of clothing which by its frequent change is so conducive to personal cleanliness, the shirt, is comparatively a modern invention, being unknown before the eighth century. A few hundred years ago the condition of Europeans was scarcely better than that of the barbarous tribes which roam our Western plains at the present day. In the same room people cooked, ate and slept; and not infrequently the oxen which tilled the soil and furnished almost the sole means of traveling, were sheltered under the same roof with the family. Even so late as the time of Henry the Eighth, England is described by historians as "a land of filth, every room full of grease, fragments, bones, spittle, excrements of dogs and cats, and everything that is nauseous." At this time London, even then a populous city, had no sewers. Into the open gutters of the street were turned the garbage, slops and offal from the households on either side, where it was allowed to accumulate, fermenting and decaying in the sun, and sending forth the most putrescent and pestilential odors. The city of Madrid was in an equally bad condition little more than a century ago, such a thing as a privy being unknown

*Paper read before the Sanitary Convention held at Pontiac, Michigan, February 1, 1883.

so late as 1760. With such a state of things is it any wonder that the most deadly epidemics swept over the world with terrific effect? Only about two centuries ago London was devastated by a plague so terrible that its ravages were stayed only by the disinfection of the Great Fire, which laid waste four hundred of its principal streets.

The close affinity between disease and dirt is no more clearly traceable in the history of the past than in the experience of the present. The greater attention paid to cleanliness in modern times has stripped the plague of its horrors and the black death of its power to strike terror to the hearts of nations; but we may still find plenty of examples of the dangerous influence of dirt in any large city. The statistics of New York City show that one-half of the population furnish three-fourths of the deaths; and an inquiry into the conditions under which the sickly half live shows that dirt is unquestionably the malign influence in operation. In some of the crowded tenements of the city the mortality rises to 55 in a thousand annually, or more than 40 more than would be the case if the conditions of life were healthful. But this does not present the whole case, since there are 14 cases of sickness for every death, making 560 cases of unnecessary illness, or half the entire population sick in consequence of filth. The average of life for the whole United States is but a fraction less than forty years; but the filth of our two largest cities, Philadelphia and New York, reduces the longevity of their citizens to twenty-five years. The same difference is observable in England between the inhabitants of the large cities and the rural districts. Statisticians tell us that in such large cities as London, the deaths are so greatly in excess of the births that only two centuries would be required to render the race extinct if the whole population dwelt in cities. Similar facts to an almost indefinite extent might be adduced to show a distinct connection between disease and dirt. We might cite the condition of Memphis and New Orleans at the time of the yellow fever outbreak a few years ago, and numerous similar instances with which all sanitarians are familiar, but we forbear.

Let us now consider the question, "What is dirt?" Some one has defined dirt as being "matter out of place," a very good definition, as it seems to us, especially from a sanitary point of view. The true sanitarian is no friend to dirt, and recognizes as such what would not ordinarily be so designated. The dirt family is a large and very numerous one, comprising many different species, chief of which are gaseous dirt, organic dirt and germ dirt. What ordinarily passes for dirt is comparatively harmless, consisting almost wholly of inorganic matter, particles of clay or other earth, which, while offensive to the sight, can not be readily shown to be by any means so greatly obnoxious to health. The dangerous forms of dirt are those which are not so readily recognized as such, and which, on account of their subtle character, are in an eminent degree pernicious in their influence as well as fatal in their effects. These three dangerous forms of dirt are usually quite intimately associated, having much the same sources, and hence can not be fully considered separately. We shall not attempt to make our study of the subject at all exhaustive or technical. We wish simply to point out some of the greatest and most common dangers to life which are associated with the different forms of dirt, and so will not stop to frame formal definitions.

As regards the sources of dangerous forms of dirt, man is his own greatest enemy. From his lungs constantly pours forth a stream of poison-laden air, and from his skin emanates the same deadly effluvia in lesser quantity. Every human being produces on an average more than four barrels of carbonic acid gas each day. This volume of gaseous dirt is poured into the air in the immediate vicinity of the individual, so that contamination occurs with the greatest facility, and with certainty, unless some efficient means is adopted to prevent it. This constant outflow of noxious matter is augmented by contributions of the same sort from lower animals, from plants during the night, when deprived of the action of sunlight, and also by the burning of candles, lamps, gas-jets, and all other forms of combustion. The latter sources of carbonic acid amount to more than is generally supposed, each candle producing half as much per hour as a man, and a large lamp or gas-jet two or three times as much. A stove in which the draft is obstructed by a damper is also a not infrequent source of this gas and in dangerous quantities. It is well known that carbonic acid gas will not support respiration nor combustion. Its suffocative property has given it the name of "choke damp" in coal mines, in which it is frequently encountered. It is naturally present in the air to the amount of two parts in five thousand of air, and may be increased considerably without immediate injury to life, provided it come from some other source than the lungs of human beings or animals. Under the latter circumstances, however, its increase in a very slight degree, even so small an amount as one part in five thousand of air, renders the air unfit to breathe again. This fact is due to the bad company which the gas keeps when coming from the sources named, viz., a variety of organic filth which is always present in the expired breath, and which is extremely poisonous in very small quantities. It is this kind of dirt which gives the air of a close room, which has been some time occupied, the peculiar fusty odor which is so noticeable to a person entering such a room from the open air. This poison is associated with the carbonic acid poison so intimately and in such regular proportions that the latter becomes the best index to the amount of the former. This kind of dirt is almost infinitely more dangerous than most of the forms of gaseous filth with which we ordinarily come in contact. It is present in the expired air in such quantity that each breath contaminates three cubic feet of air to such a degree as to render it unfit to breathe, and a cause of disease if breathed. As we ordinarily respire about twenty times a minute, it is easy to compute how long the air in a seven-by-nine bed-room would last, its air being used up at the rate of sixty cubic feet per minute, or double the quantity if the room is occupied by two persons. Supposing the room to be nine feet in height, and wholly unventilated, the air will be used up inside of ten minutes, or a proportionately less time if occupied by more than one person. It is fortunate indeed for the civilized part of the human family that our doors and windows do not fit air-tight and our walls are not wholly impervious to air. Nature compels us to be more obedient to her laws than our own perverted instincts would incline us to be, by forcing into our domiciles, through every crack and crevice or an occasionally-opened door, the life-giving oxygen which we take such infinite pains to exclude. It is only when we come to appreciate these facts that we can understand the assertion

of the sanitarian that each human being requires not less than three thousand cubic feet of pure air per hour to wash away the gaseous and organic filth with which he contaminates the air about him.

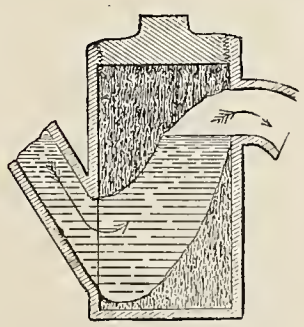
Perhaps some one will raise the query, How do we know that the breath is the source of these deadly enemies to life? I will attempt to demonstrate their existence by an experiment or two, so simple that any of you can repeat the same at home, if you like. This flask contains a small quantity of carbonate of calcium, commonly known as chalk, a compound of carbonic acid and lime. I will pour upon the powder a dilute solution of hydrochloric acid. You observe that a lively effervescence at once occurs. The acid which I have added is taking the place of the carbonic acid, which accordingly escapes as a gas, and passing through this tube bubbles up through the liquid in this other flask, which is lime water. A moment ago the liquid was clear and colorless as water; you see it has now become milky in appearance, the opaque white color becoming more and more marked as the experiment continues. The white color is due to the reunion of the carbonic acid with the lime in solution in the water, forming little particles of chalk exactly like those which we had in the first place in this other flask. This experiment reveals to us a simple test by means of which the presence of carbonic acid may be determined, although the gas is colorless and odorless. Let us apply the test to this jar in which a candle was burning a moment ago, but gradually burned lower and lower until its flame expired, quenched by the carbonic acid of its own production. Adding a little lime water and shaking the jar, the change in color is apparent, and we have the evidence of the fact that carbonic acid is produced by combustion. Now let us apply the test to the breath. This we can readily do by breathing through this tube and allowing the expired air to bubble up through a quantity of lime water contained in this small beaker. In less time than is occupied by the explanation you see the same change in color, affording an ocular demonstration of the presence of carbonic acid in the breath. By collecting the white precipitate and weighing it we may readily determine the amount of carbonic acid present in the breath. It is possible to vary the experiment in such a way as to show that a small quantity of carbonic acid is eliminated by the skin, which is a breathing organ as well as the lungs.

The organic poison of the breath is much more difficult to detect, as its proportion is not large, though its potency is great. It is associated with the moisture of the breath, and, taking advantage of this fact, I have collected a small quantity by breathing through a small chamber surrounded with a freezing mixture at a temperature near zero. I hold in my hand a solution which is a test for organic matter. As I add the test, drop by drop, you observe that the purple color which appears for a moment quickly disappears, instead of remaining, as you notice to be the case with the pure water in this other beaker. The amount of the test which thus disappears furnishes an index to the amount in the breath.

In this glass I hold a quantity of perspiration which exuded from the skin of a patient undergoing a Turkish bath. On applying the test we see the same result, proving the presence of a large quantity of this organic matter. When left long in contact with the skin on which it is deposited, a considerable portion of this noxious substance is undoubtedly absorbed back into the body, contaminating the life-current and defiling all the tissues. A man who resided not half a hundred miles from Pontiac objected to taking the warm bath which I prescribed for him a few years ago, declaring that a drop of water had not touched his back in forty years. What must have been the condition of his system, leaving out all æsthetic considerations, and what must have been the condition of the great unwashed multitudes of Europe during the thousand years when the bath was absolutely unknown? In cold weather, this potent poison, or the moisture in which it is dissolved, may be seen condensing upon the window panes, sometimes forming a dense layer of frost, and often woven by the mysterious fingers of Nature's silent workers into the most fantastic designs, sometimes presenting views of startling beauty, as if thus designing to conceal the deadly agent of disease and suffering hidden within its sparkling folds. A few weeks ago I stepped into an unventilated railway car when the thermometer was several degrees below zero outside, and found the accumulation of this frozen filth upon the windows nearly an inch thick. Did it ever occur to you that the same condensation is constantly taking place upon the walls and ceilings of our homes? A layer of frost such as covers the windows in a cold day would be also visible upon the walls were it not for the fact that our walls are porous and absorb the filth as fast as it condenses, thus preventing its visible manifestation. The accumulation goes on in a house, the rooms of which are not freely exposed to the disinfecting influence of air and sunlight, until the plaster and paper covering its inner walls are completely saturated with decomposing filth, which pours out continually upon the occupants of the house a stream of noxious gases and other forms of dirt. But the lungs and the skin are not the only sources of gaseous and organic filth; the cesspool, the gutter, the vault, the neglected cellar, the wood-box, the back yard, the stable, the pig-sty, the garbage barrel,—all these and a hundred other sources constantly pour out a deadly stream of poisonous gases and organic filth.

(To be Continued.)

THE NEW CITY MORGUE.



BOTTLE TRAP CHOKED.

Dr. De Wolf and Mr. Cregier, Commissioner of Health and Commissioner of Public Works, respectively, were instructed by the City Council, a month ago, to visit Eastern cities and learn what they could concerning morgues. The trip was made and the result is a plan for a new morgue in Chicago, which embodies all the best features of the morgues inspected and some which are believed to be a great improvement upon those of any similar structure in existence. The plans given below were prepared by Mr. Genung, of the Health Department, and have been accepted. The building will be of brick, two stories and basement high, and will cost $12,000. It will stand upon the lake shore at the foot of some street. Standing as it will near the lake, ice can be readily cut and stored in the winter, a portion of the basement being set aside for this purpose. The plans are self-explanatory, but attention may be called to one or two novel features. The front of the identification room will be of double plate glass, with a dead air space between, thus preventing that condensation which would take place on a single plate. An ice-box will occupy the upper portion of the identification room, and the arrangement is such that the cold air from the ice will fall directly upon the bodies and, as it becomes warm, be conducted to a side flue which communicates with a warm air-shaft, extending to and above the

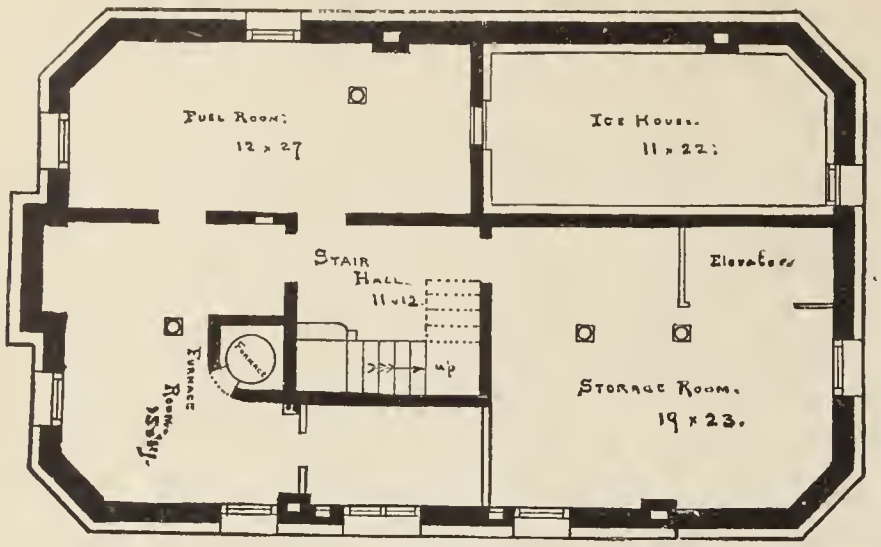


FIG. 1.—BASEMENT.

roof. Air is admitted to this room through an aperture opening into the hall above the door. Special provision is also made for the ventilation of the receiving room and for the autopsy room immediately above, shown in Figure 3, so that it is impossible for any of the rooms to become contaminated by foul or poisonous air. This ventilation is provided through a shaft 3x5 feet in size, indicated on the plans, extending from the first floor to and above the roof. Steam coils, or gas-jets, will be placed in this shaft at the top to secure an upward movement of the air when natural ventilation fails, if such a thing should occur. The open-

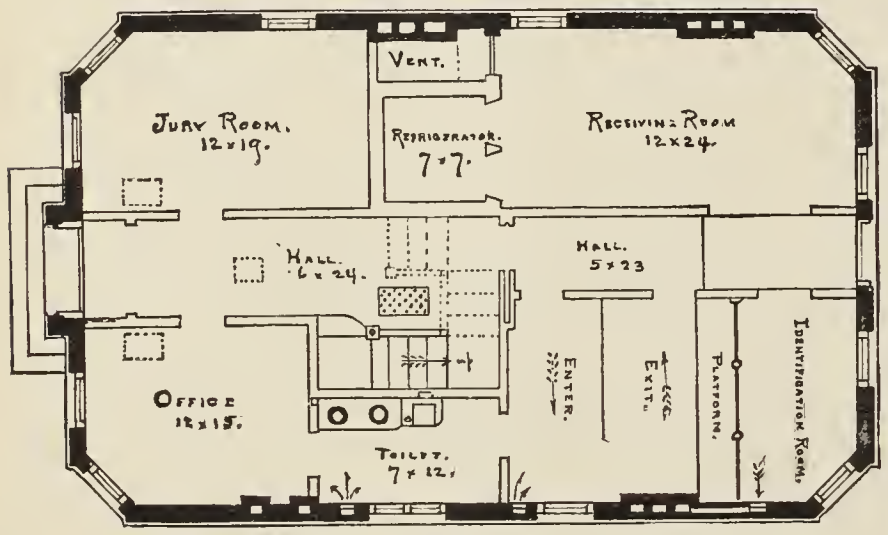


FIG. 2.—FIRST FLOOR.

ings into this shaft from each of the rooms will be both at the floor and ceiling. The rear part of the building, that portion fronting upon the lake, and which is devoted to the storing, exhibition and handling of the bodies, is entirely separate and distinct from the front part, in which are the keeper's living rooms (see Figure 3), jury room, office, furnace room, etc. To secure this complete separation the walls will be made of hollow tile, and coated with some non-absorbent material. The floors will be cemented and rest on iron beams.

Mr. Genung first planned for a separate structure for the receiving and living rooms, but its cost stood in the way of its adoption; but the

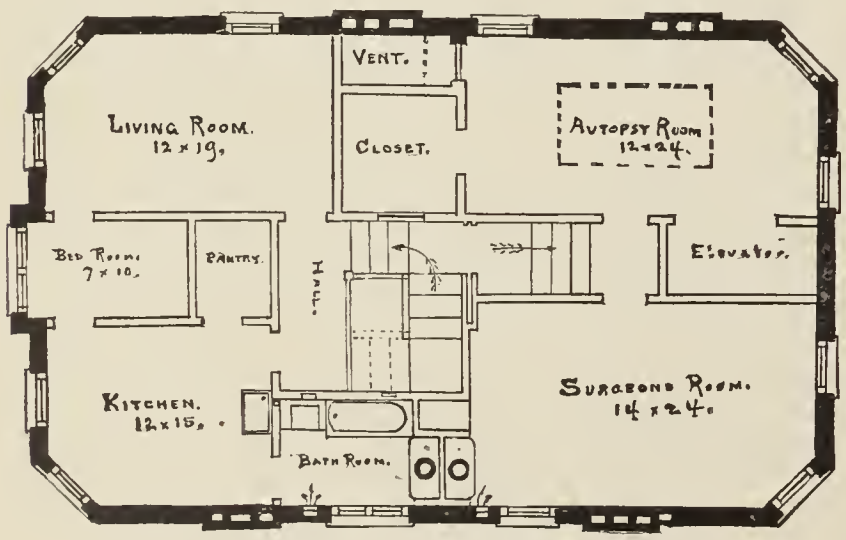
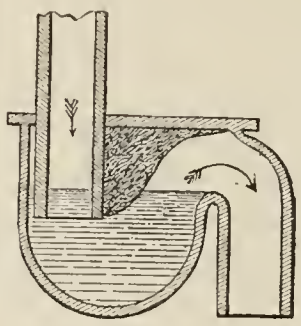


FIG. 3.—SECOND FLOOR.

plan given is conceded to have all of the other's desirable features and to be otherwise entirely satisfactory. The fact that the identification room is so arranged and equipped that the bodies may be left in it indefinitely without change, and be readily accessible for examination, is unusual and important.

A MODEL OFFICE BUILDING.



D TRAP.

The most substantial and otherwise superior building in the city at the present time, probably, is the new office building of the Chicago, Burlington and Quincy Railroad Company, at the corner of Adams and Franklin streets. It is built of St. Louis pressed brick, moulded especially for that building, with unusually solid stone foundations. The building is 125x175 feet in size, six stories high, with basement and sub-basement. The feature of the building, architecturally, is an interior court, 55x65 feet in size, within the stairways, or balconies, which extend around the court at every floor. All the rooms are thus lighted both from the outside and from the court, which is covered by a skylight. This court is practically a large room, and through it heat is introduced, in part, to the offices, immense coils being placed immediately beneath the floor of the court. Coils are also placed in the rooms themselves, to be used when needed. The warm air from the court is conducted into the rooms through registers placed eighteen inches, or two feet, above the floor. The foul air is taken out through flues in the outer walls, the registers being placed at about the same height above the floors. Practical tests were repeatedly made of the exhaust power of these flues, and it was found unnecessary to induce an upward movement by artificial means. The flues which are used for the ventilation of the water-closets, however, have steam-coils near the base.

All that money and skill could produce appear in the plumbing and drainage. There are two main drains, each six inches in diameter, conveying, respectively, the waste from the sinks, wash-bowls and downspouts, and the contents of the water-closets. The material used for these drains in the street to a point two feet outside of the curb-line is vitrified sewer-pipe; from this point to the bottom of the soil and waste-pipes is six-inch and four-inch cast-iron gas pipe. The soil, waste and ventilating pipes are of the standard wrought-iron pipe, and all fittings are of cast-iron. The cast-iron pipe is of the quality manufactured by Dennis Long & Co., of Louisville, cast on end and weighing, for six-inch pipe, twenty-five pounds per foot, in twelve-foot lengths, and for four-inch pipe, sixteen pounds per foot, in twelve-foot lengths. All cast-iron pipe is coated on the inside and outside, while hot, with coal tar varnish; the wrought-iron pipe and fittings are coated inside only, while hot, with coal-tar varnish. The weight of the wrought-iron pipe for soil, waste and ventilating pipes is 10.728, 7.347 and 3.667 pounds, respectively, for four-inch, three-inch and two-inch pipe. The cast-iron pipe outside the walls of the building are laid five feet below the surface of the ground, and the sub-basement drainage is laid below the surface of the floor. The cast-iron pipe for all drainage except the sub-basement is hung from the floor girders of the basement floor, or supported on brackets bolted through the walls, the hangers or brackets being of wrought iron. The soil, waste and ventilating pipes have but one support for their weight—that at the base, but have intermediate lateral supports, or guides, of wrought-iron, put in at distances not exceeding fifteen feet from each other. The joints in the cast-iron work are well-calked with hemp gaskin, with not less than one and one-half inches in depth left for melted lead, which was calked with a two and one-half-pound hammer. The joints in the wrought-iron pipe are made with well-cut threads, thoroughly coated with stiff red lead and screwed home. The grade for the work is one-fourth of an inch per foot, and all deflections in line or grade are laid with curved pipe of not less than six inches radius. The soil-pipes consist of one five-inch wrought-iron pipe, and three four inches in diameter. With these are connected sixty-nine closets, besides urinals, as follows: With the five-inch pipe, first floor, six; second floor, six; third floor, nine; fourth floor, nine; fifth floor, nine; sixth floor, nine. One four-inch pipe has three closets on each of the third, fourth, fifth and sixth floors; another four-inch pipe has two on the second floor, and the third pipe seven on the sixth floor. The Brighton closet, trapped, is used, and the back, sides and floors of the urinals are of opaque glass, the supports and mountings

finished in brass. The soil-pipes are ventilated by extending them to and above the roof full size, opening upward and not surmounted by any cowl or other contrivance. The traps are separately ventilated by a pipe which extends upward above the highest fixture, where it is turned into the soil-pipe. The wrought iron waste-pipes, three inches in diameter, are also carried through the roof without offset. A separate one and one-half-inch branch wrought-iron pipe is carried upward from the lowest fixture connected with each waste-pipe above the highest—then turning into the waste-pipe—to ventilate the traps. The catch-basins are three-feet inside diameter, with eight-inch walls, and five feet high. The man-holes are three feet in diameter with four-inch walls. The drains are all in sight in the sub-basement and accessible, except a single short one which connects a sink with a catch-basin, and the ground, or surface, drains. The contents of this catch-basin are pumped up and into the main drain. All vertical pipes are erected clear of walls and partitions and all are painted with two coats of red lead and boiled linseed oil, and three coats of white lead and boiled linseed oil. Each soil and waste-pipe is connected with a flue adjoining the smoke stack, two feet square, one of these ventilating pipes, four inches in diameter, being extended to the top of the flue. There are seven bowl-waste pipes and two sink waste-pipes in the building. With fifteen water-closets connected with the five-inch soil-pipe there has never been a stoppage, nor in the four-inch pipes, with one of which there are connected twelve closets. It is arranged that all the water-closets and soil-pipes can be flushed at the same time. It was provided at the outset that the plumbing and drainage should not be accepted until it stood the severest test which could be applied—closing them at the street connections and filling them with water. The test was entirely satisfactory, no water escaping anywhere, notwithstanding the pressure at the lower joints was not less than forty-eight pounds to the square inch.

There are seven slop-sinks throughout the building and fifty wash-basins. Both the supply-pipes and the waste-pipes are extra heavy, the latter being two sizes heavier than is ordinarily used. Both supply and waste-pipes are laid in lead troughs, and are readily accessible through the floor, the boards in which directly over the pipes are fastened with brass screws. All safe-wastes are connected with separate pipes which are conducted to the basement and discharge immediately over a sink. As the building, with reference to the plumbing, is divided into three sections, any leak can be readily traced to its source. Bower's traps are used under the wash-basins, but the S trap under the slop-basins and sinks, all ventilated. The urinal troughs discharge into a drum trap and thence into three-inch waste-pipes.

As to the water-supply, the first and second floors are supplied direct from the street main; the other floors are supplied from four tanks in the attic.

There are 550 gas-jets in the building; the chandeliers are of an exceedingly rich and tasteful pattern, with brass finish. The gas is controlled by stop-cocks on each floor.

There are 317 persons employed in the building, 27 of whom are females. No other building in the city furnishes its occupants with so favorable sanitary surroundings; there will always be plenty of room, pure air and good light. On the top, or sixth, floor there are separate dining-rooms for the officers and the employés, kitchens and a suite of rooms for the janitor and his family.

This building cost about $350,000. The architects were Messrs. Burnham & Root. The specifications for the drainage were drawn by Mr. William S. MacHarg, the work put in by the Durham House Drainage Company, and the plumbing by Mr. E. Baggot.

THE PERMEABILITY OF WALLS.

The Builder, of London, gives the result of some recent experiments with reference to the permeability of walls as affecting ventilation. These experiments have been conducted by M. Emile Trelat, a well-known French architect; Messrs. Jeneste & Herscher, celebrated ventilating engineers, and M. Somasco. The results attained, so far, are in contradiction to previously-accepted facts. Avoiding joints, which are, it is urged, a frequent cause of error, M. Somasco found that the amount of air passing through an ordinary wall, at a pressure of 30 kilogrammes per square metre of surface, was only 120 litres per square yard. Under the normal pressure only 40 litres of air per square yard of wall would penetrate the room, and if the room were of the general size, this supply of fresh air would not represent more than 2 per cent. of its cubic contents per hour. Basing his arguments upon these figures, M. E. Trelat argues that the porosity of walls is of little importance so far as ventilation is concerned; but he urges that the passage of oxygen through the pores of walls may contribute to preserve the purity of the materials with which they are built. But a wall becomes an absorber of miasma, and too often little better than a reservoir of disease. Nothing, therefore, should be done to destroy the porosity of walls bathed externally by the purer out-door atmosphere. They should, on the contrary, be allowed to absorb to the utmost the fresh air, so as to purify the materials with which they are built, if not to ventilate the rooms within. For partition-walls, however, M. E. Trelat would employ every means of rendering them air-tight. There is no advantage in allowing the more or less foul air of one room to mix with that of the next room. By such filtration from one room to the other the walls simply become "miasmatic sponges."

Pettenkofer's experiments, commenced in 1853, show that the diffusion of air through the body of walls is far greater than is noted by M. Somasco; but that it was modified considerably according to the direction and velocity of the wind, or the difference between the internal and external temperature. Further, rain, by clogging up with water the external pores of a wall, helped to check the passage of air. While insisting that the amount of air supplied to a room, through porosity of the walls, is much more considerable than that discerned by M. Somasco, Dr. E. Vallin would nevertheless render even the outer walls absolutely air-tight. Complaints were made that walls rendered air-tight by enameling or other means allowed humidity to gather and run down in drops. But this humidity, produced to a great extent by respiration and the heat given off from human bodies, contains in dissolution the organic matter derived from our respiration and secretions. Absorbed by the pores of the wall, the solution evaporates and deposits the organic and putrescent matter it contains, and no experience has yet shown that this matter is destroyed in porous walls by the action of the air, as is the case with respect to well-drained soils. Thus walls, in spite of the infiltration of air, become what M. Trelat has defined as "miasmatic sponges." If, on the contrary, the sides of the walls are rendered impervious by a vitrifying wash or a silicate paint, the water, by condensing on the surface, renders the washing, or at least the wiping, of the wall a matter of absolute necessity, and thus secures the immediate removal of the organic matter, which, if left to putrefy, would so gravely endanger the health of the inhabitants. In such buildings as hospitals and barracks the observance of this principle is more especially essential, and Dr. Vallin points to the lying-in hospital known as the Pavillon Tarnier, where the mortality from puerperal fever, etc., has been so marvellously reduced by constant and careful washing of the walls with an abundant supply of water. Not satisfied with mere paint, it is now proposed to protect these walls with porcelain, with plate-glass, or sheets of zinc, which would be absolutely impermeable, thus facilitating the washing, and rendering the absorption of organic matter impossible. In one word, therefore, Dr. Vallin admits that the porosity of walls is very considerable, and urges that, as it is also very dangerous, it ought to be prevented even in the case of external walls.

Dr. Van Overbeck de Meijer, of Utrecht, has not only studied Pettenkofer's experiments, but, with some slight modifications, has repeated each one of them in his own laboratory, and confidently asserts that his own experience confirms in every respect the results previously attained by the German professor. If we allow a difference of temperature of one degree Centigrade, there passes through an ordinary wall, per hour, per square metre, 245 litres of air. By these experiments, it has also been demonstrated that no inconsiderable quantity of air forces its way through wood, especially through the joints that inevitably occur in putting wood together. Dr. Meijer does not, however, count so much on these currents as a means of local ventilation, but looks to the effect they have in reducing the dampness of confined air. When the pores of the walls are blocked by water and dust, the confined air can no longer pass out of the house, and the water, evaporated from the human beings dwelling within the house, condenses itself on the internal surface of the walls, the balustrades of the staircase, etc. Then, indeed, the house becomes scarcely habitable, and is often extremely unwholesome. One example, given by Pettenkofer, helps to confirm this argument. Some workmen's houses in Germany were built with the *scoriæ* or refuse from the neighboring iron-works. This metallic material, thoroughly air-tight, was very rough

and irregular in shape. The fitting of the pieces together necessitated the use of a large quantity of plaster; and the interstices between these *scoriæ* were so numerous that the walls still retained a certain amount of porosity. Ultimately, however, a means was discovered of cutting the *scoriæ* into even shapes, so that they could be fitted tightly together; this entirely destroyed the porosity of the walls. The evaporation outside of the damp arising inside was thus rendered impossible, and the houses became so extremely unwholsome that they had to be abandoned. The money spent in their construction was entirely lost. Dr. Meijer, therefore, is in favor of maintaining the porosity of all the walls, the partition or internal walls, as well as the outer walls, and this porosity he would further extend to ceilings, roofs, and floors. In fact, every house should be made as porous as possible, unless a very perfect system of artificial or mechanically-contrived ventilation be introduced which will work as effectually during the night as during the day.

It is concluded that where the danger of infection is especially great, as, for instance, in hospitals; and where, at the same time, means of artificial ventilation are more easily established, it would be preferable to follow Dr. Vallin's advice, and destroy the porosity of the walls, and especially that of their inner surfaces. On the other hand, for private dwellings, where the presence of disease germs and organic matter in the atmosphere is not prevalent to so great an extent, it would be preferable to follow the advice given by Professor Van Overbeck de Meijer. The science of ventilation is not yet sufficiently understood for us safely to dispense with the accidental ventilation that so often helps to compensate for the ignorance or indifference of the public, and this view we have long held and often expressed. In England, however, the porosity of walls has been studied, not so much with a view to its effect on ventilation as to its influence on the dampness of dwellings. The exceptionally damp characteristics of the English climate, and the particularly porous nature of the bricks with which the greater part of our houses are built, have naturally led the public to patronize the paints and distempers which profess to exclude moisture. In seeking to attain this latter end, but few persons have paused to consider how far they interfered with ventilation, or prevented, especially when applying their paints to the outside of the house only, the oxidation, by infiltration of pure air, of the organic and putrescible matter absorbed within the pores of the walls.

THE HOUSE INTERIOR.

THE decorations and hangings of the new Calumet club-house in this city are bright, harmonious and well-chosen. Good colorings and rich effects run through all the designs, while the decorations in wall surface and draperies are nowhere oppressive, nor inappropriate to the constant use of the rooms. The walls of the main hall are of deep red and gold; the richly-ornamented brackets supporting the arch are of bronze, and the ceiling is a soft, pleasing tint of gray. The large parlor opening from this hall has olive-tinted walls, with a mosaic-like decoration in colors; the cove simulates the rich effects of velvet, and the ceiling of lighter olive has scattered conventional ornaments. The Wilton carpet in this room is of a bronzy-olive with border, harmonizing well with the oak of the woodwork. The curtains are of Indian red linen velours with a wide dado stripe of tapestry, the design showing bronze, gold, olives and reds shot with gold tinsel, and a corresponding frieze. Across the arch of the alcove made by the circular front of the building, a heavy curtain of solid red velours, with Venetian borders, hangs from a rod. The three alcove windows, like the ten large windows in the room, have transom lights of stained glass of effective colors; below these hang thin curtains of Crete, their subdued tones continuing and blending with those of the transom. This alcove has walls of a darker olive than the main room. In the card-room on the second floor above the parlor, the walls are simply treated in browns and reds. The design of the Wilton carpet is reproduced from that of an old rug in the South Kensington Museum, and the curtains are of olive tapestry in two shades with a dado of bright pomegranate, broken with a border of cloth of gold, the figures repeating the colors of the carpet. The frieze is of old gold with a band of the cloth of gold. The curtains are looped back with a rope of silk, combining all the colors in the drapery. The alcove curtain has a pomegranate ground with powderings of fleur-de-lis in tinsel embroidery. The dado is of dark steel-blue plush with a band of the cloth of gold, and the frieze is sea-green and gold, the bands being separated with a tiny silk fringe in all the shades. This curtain lights up finely and gives a rich play of color. The walls of the large dining-room show a brocaded pattern in two shades of old blue. The private dining-rooms are decorated in modern Japanese designs, the frieze and centerpiece of the ceiling having medallions of gilded antique lace, and the ceiling decoration is finished with a coiled gold rope. The windows of the center room are curtained with Florentine hangings of bronze and olives, with a Persian dado and side borders. The rooms on either side have curtains of red chenille with Persian effects in the borders. Some of the portieres show the designs of India rugs, outlined with tinsel, and others are of old red chenille with dado in antique colors shot with gold. The wall and ceiling decoration is the work of Messrs. Healy & Millet, and the draperies were designed and made by Mr. Haskins.

* * *

The London Times, in commenting on a lecture on "Art in the House," says: "While the fine arts have a mission to educate and to guide, they ought to be able without disparagement to act as good domestic handmaidens. That is their vocation in relation to homes. No moral law forbids a man, rich enough to afford the outlay, to hang on his walls a masterpiece by Titian. But he is then treating his house as a public gallery, and engages himself to sit at the feet of his own possession. Art in its character of domesticated art abdicates the independence of its individual manifestations. Its object is to make home life easier and more agreeable. All its aims and aspects in this capacity ought to be subordinated to each other, and to a collective comfort and convenience and refinement. Separate artistic effects should be subordinated to the general result. Art invited to serve a house has no business to use its quarters either as a museum or a curiosity shop." There is a hint and a warning in these words which are worth consideration. In the present craze for artistic furnishings, people are in quite as much danger of thoughtlessly committing everything to the hands of the decorator as they were a few years ago of a blind acceptance of the decrees of the upholsterer. A house, like a costume, should be individual, and the personality of the owner should be felt in its adornments as well as in its comforts. The heartily-spoken comment, "It looks just like you," is the highest praise that can be given a home or a dress. This underlying pervading sense of a personal presence, which makes all the difference between a dwelling-place and a home, involves personal thought and care, and can not be relegated entirely to the most skillful decorator, though he is a valuable and necessary ally. A house fresh from the hands of the artist and his assistants, in whose furnishing the dweller has had no voice, is a strange, unhomelike place, through whose rooms, be they never so correct in style or harmonious in color, he wanders with the unrest of a stranger. In these things, association only is possession, and it comes slowly when belongings, even the most exquisite, are thrust upon their owner. The article quoted above has a closing thought which is worth attention. "There are two golden rules in the art of furnishing. One is that no furniture shall be bought which is not at the time perceived and felt by the purchaser to be fitted for his and its purpose. The other is that what has once been intelligently selected and approved, though for the moment distanced in favor, should be regarded as exceedingly likely to be approved again.

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AT Gibson, Parish & Co.'s, the new upholstery materials are shown in excellent colors and designs. In the cheaper grades, the various figured jutes and ramies are seen, although there is a tendency to replace these with all-wool materials, and the tide seems to be setting somewhat in the direction of solid colors. The part-cotton fabrics are bright and effective, but they are not altogether durable or satisfactory. One of the newest textures is a silk and wool damask in an all-over floral design, the two shades of the color giving a fine play of light. It is fine and soft, drapes admirably, and is excellent for curtains. It is found in all the popular shades, a deep, rich red and a warm olive being among the most desirable. This fabric is an old fashion revived, and it promises to become very popular. The old-fashioned wool damask, with which we are most familiar in church upholstery, is also reappearing for household use. Some beautiful silk velours show a design of flowers and foliage in brown velvet on a gold or pale blue surface. Linen velours, with a bright Persian design and tinsel embroidery, is very popular, both for hangings and furniture. It has a sumptuous oriental effect which is very pleasing. Squares of this material with embroidered designs come for chair seats and backs. Plain plushes and satins are always popular, and

they have never been shown in so great a variety of desirable shades. A very rich and beautiful fabric has a ground of heavy silk with raised figures in plush. These designs are as clearly cut and as finely brought out from the corded background as if they were applied by hand. They show the most attractive shades of red, olive, peacock blue, pomegranate and gold. The new embossed leathers are soft and pliable, and are suited to all the demands of upholstery work. They show a variety of excellent colors, and flowing floral and scroll patterns, as well as some good reproductions of antique designs. This material is coming into use for mantel coverings, mirror frames and furniture, as well as for wall hangings. A curious old design, suitable for use in a dining-room, has fish and scrollwork, suggesting rolling waves, on a warm reddish-brown surface.

* * *

Messrs. Healy & Millet show many excellent decorative designs in which they have put some materials and processes to a very novel use. A very effective decoration, of which they have the exclusive use in this city, is formed by applying squares of heavy antique lace on a stiff background. This background and the lace are treated with gold, silver or bronze, coloring, and form effective ornaments, whose origin the uninitiated observer would not suspect. These are used for frieze or ceiling decoration. A similar fancy is a common twine net stretched on a foundation and showing a brilliant copper hue. Squares of corrugated paper in the same metallic colorings are combined for frieze ornamentation. Rough cork paper is similarly treated and makes rich and effective panels. These metallic effects run through much of the new decorations, and are capable of almost unlimited variety in application. Powders in bronze, gold, copper and flesh tints are applied to panels, giving a glittering surface, which takes the light admirably. Some fine corrugated glass in opalescent colorings has rare beauty, the aqua marine and some mottled tintings being very good. A new effect is shown in a circular piece of crackle glass on whose surface are scattered bits of molten glass in various colors, giving a brilliant rococco effect to the whole

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The aim of all good decoration is good effect, whether of contrast or harmony, and the materials for producing this effect, or the methods by which it is reached, are of secondary importance. Comfort and fitness are the first considerations, and when they are lost sight of failure is inevitable, as without them the most elaborate ornamentation becomes a weariness to the flesh. Breadth and unity of treatment are also necessary. A room should have no glaring points of color to attract and weary the eye. A thoughtful housewife, exercising half the care in arranging her house that she gives to the preparation of her dresses will be continually making new discoveries and achieving successes. Her tendency to overdo the work will be her chief stumbling-block. The essentials of every other fine art, breadth and simplicity, are equally necessary here. The woman who elaborates is lost. If the character of the housewife is expressed in her rooms, as it very often is, how many overloaded apartments, where meaningless or tawdry ornaments are multiplied to the exclusion of all comfort, suggest the lament of the husband of the efficient though wearing housekeeper, "She is such a fidgety thing."

* * *

An exhibition of stoves of earthenware was recently made by Messrs. Doulton & Co. in London. The stoves are of fire-clay, glazed in color, and no iron is used about them except for the grate and its doors. There is no danger of overheating, and none of the disagreeable smell which arises from hot iron stoves. There are arrangements for conducting the smoke and heated air from the fire through chambers in the upper part of the stove, open tubes for setting the air of the room in motion and warming it as it passes, and, in the larger sizes, for heating fresh air from without. Some of these stoves resemble the old-fashioned earthenware stoves of Germany. Some show very pleasing decoration, although the most effective decorative treatment has been bestowed on the open fireplaces, where the richly-colored tiles of Doulton ware for hearth and panels have been used.

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A small table cover, recently embroidered at the Decorative Art rooms is of a delicate blue-green plush, almost an aqua marine tint, with a bunch of water lilies embroidered in one corner, the full yellow stamens being done in yellow silk and gold thread.

Martha Howe Davidson.

HEALTH IN MICHIGAN.

According to the latest bulletin of the Michigan State Board of Health, erysipelas and neuralgia were more prevalent during the month of February just passed than during the same month for the preceding six years, while remittent fever, pneumonia, diphtheria and whooping-cough were less prevalent. It may not be asserted positively that there was any relation between these diseases and the condition of the atmosphere, but it is reported that during the month indicated the temperature was lower, the absolute humidity and the day ozone less, than in the corresponding months of the five previous years. During the week ending March 3, one case of small-pox was reported, and that from Detroit.

THE MASTER PLUMBER'S ASSOCIATION.

At the last meeting of the Chicago Master Plumber's Association a committee was appointed to confer with the New York Association with reference to co-operation, consisting of Messrs. Young, Baggot, Boyd, Hamblin, Harvey, Livingston, Nacey, Moylan, O'Malley, Roche, Sanders, Simms, Wade and Whiteford. The Sanitary Committee were authorized to advise the public that disinfectants be used liberally in cellars and basements that overflow. "A solution of copperas," their report continued, "sprinkled over cellars, and a thorough airing of the same, will be time and money wisely expended. A flooding of your cellars means a poisoning of the earth. Particular attention should be paid to the condition of air-ducts and furnaces, and the connections of sewers examined and put in order."

CURRENT PUBLICATIONS.

"THE MODERN AGE."

With the March number this magazine is enlarged to sixty-four pages. The editor's claim that "no other publication gives so much good matter in such convenient shape for the same amount of money," is apparently well-founded, if the interpretation of "good matter" is understood to be light literature of the better kind.

"THE CONTINENT."

The four weekly numbers of "The Continent" for February, bound together in a monthly part, contain nearly one hundred illustrations, accompanying articles which cover a wide range of artistic and literary enterprise at home and abroad. The periodical is continually improving.

BOOKS AND PAMPHLETS RECEIVED.

"Law Reform and the Future of the Legal Profession." By C. C. Bonney, President of the Illinois State Bar Association. The annual address delivered at the sixth annual meeting, held at Springfield, January 4, 1883. Chicago: The Chicago Legal News Company.

"Metropolitan Sewage and What To Do With It." Part 1. By Edward Monson, Assoc. M. Inst. C. E. London: Prentice & Monson, 47, Upper Thames street, E. C. Price, Half-a-Crown.

PERIODICALS RECEIVED.

"Building," Wm. T. Comstock, New York; "Builder and Woodworker," New York; "The Mechanical News," New York; Van Nostrand's Engineering Magazine," New York; "The Literary News," New York; "The Publisher's Weekly," New York; "Hall's Journal of Health," Boston; "San Francisco Western Lancet;" "The Medical Age," Detroit; "The Detroit Lancet;" "The Chicago Medical Times;" "New York Medical Abstract;" "Cincinnati Lancet and Clinic;" "New Orleans Medical and Surgical Journal;" "The Physician and Surgeon," Ann Arbor.

NOTES AND NEWS.

THE ELECTRIC LIGHT.

In Philadelphia the City Council has adopted an ordinance regulating the introduction and management of underground and electric wires. It provides that the city shall have the use of the wires for police, fire and municipal purposes. When used for electric lighting, they will be taxed $2.50 a mile, and $1 for telegraphic or telephonic purposes, and an annual license charge of five cents a foot will be laid upon all underground conduits over six and not less than twelve inches in diameter; larger conduits will be charged ten cents a foot. Overhead electric-light wires

will be taxed $5 a mile, and telegraph or telephone wire $2.50 a mile, per year.

The Edison Company charges $1 per one thousand candles of light, in New York City—equal to gas at about $2 to $2.25 per one thousand cubic feet.

The Dayton Electric Light Company has been organized with a capital of $100,000. The stock is subscribed by home capitalists.

MISCELLANEOUS.

The City Council of Wilmington, Del., has before it two plans for a system of sewerage for that city, prepared by Rudolph Hering, civil and sanitary engineer of New York. One plan provides for draining the entire area lying within the city limits, serving double the present population and carrying the sewage to the Delaware river, at a cost of $546,000. The other plan provides for the partial completion of the former, draining into the Christiana river, to cost $230,000.

A vein of natural gas has been struck by drilling at Hill's Station, about twenty miles from Pittsburgh, Pa., where glass-works are in course of erection. Between $2,000,000 and $3,000,000 will be invested in the plant.

A gentleman from London broke into a house at Darlington, in which two persons had died of small-pox, and sold the furniture. Thirty cases of small-pox have since occurred in consequence.

BUILDING INTELLIGENCE.

CHICAGO.

The following structures are being built, or will be soon, from plans by Architect L. G. Hallberg: Three-story and basement flats on Wood street, for George L. Max; two-story flats, 22x58, on California street, and two-story flats, 74x30, of pressed brick, for Dr. E. F. Ingals.

Architect B. W. S. Clark has prepared plans for a two-story frame house, 34x51, Queen Anne style, to be erected at Englewood for F. A. Adams. The mason work has been let, and the foundations are being built. The house will be ready for occupancy about June 1.

Mr. J. C. Cummings will build a $10,000 house on Dearborn avenue near Division street from plans drawn by Messrs. Edbrooke & Burnham. The same architects have prepared plans for a house for Mr. George P. Dunham at Evanston, to cost $10,000.

Plans for three apartment houses at the corner of College place and Rhodes avenue have been completed by Architects Wheelock & Clay. The buildings will be 60x150 feet in size and conform in style of architecture with the University.

Architect J. M. Van Osdel has prepared plans for an elegant residence for Mrs. Ellen Spry at the corner of Monroe and Loomis streets, to cost $25,000. The two fronts will be of the best quality of Anderson pressed brick.

Architect Boyington promises that the new Board of Trade Building shall be completed and ready for occupancy by May 1, 1884. The Union Foundry was given a contract last week for $60,000 for iron work on the building.

The Standard Brass Manufacturing Company has recently organized in this city with well-known dealers for its leading officials. It is one of the largest firms in Chicago, dealing exclusively in plumber's supplies.

Proposals for work on the addition to the depot building at the foot of La Salle street will soon be advertised for by Architect Boyington.

DAYTON.

The city of Dayton, O., will have a large number of new substantial buildings erected this spring. Among these will be a business block at the southeast corner of Fifth and Jefferson streets, five stories high and of pressed brick with stone trimmings, for stores and offices; a business block, by Mr. Benjamin Kuhns, of pressed brick, at the corner of Fourth and Main streets; an office and business block, four stories high, by Mr. W. P. Callahan, on North Main street; a pressed-brick business block, by John Gorman, Secretary of the Police Board, on South Jefferson street; a car-fixture supply manufactory, by the Dayton Manufacturing Company, at the end of Third street, and a new business block, by Mr. John Balsley, on East Third street, near the canal.

The Dayton Electric Light Company will erect a building, 100x50, at once. The Company has provided for both steam and water power.

BUILDING PERMITS.

The following is a list of new buildings in the cities indicated for which permits have been granted since the last issue of THE SANITARY NEWS, giving location, size, cost and name of owner; all buildings are of brick unless otherwise specified:

CHICAGO.

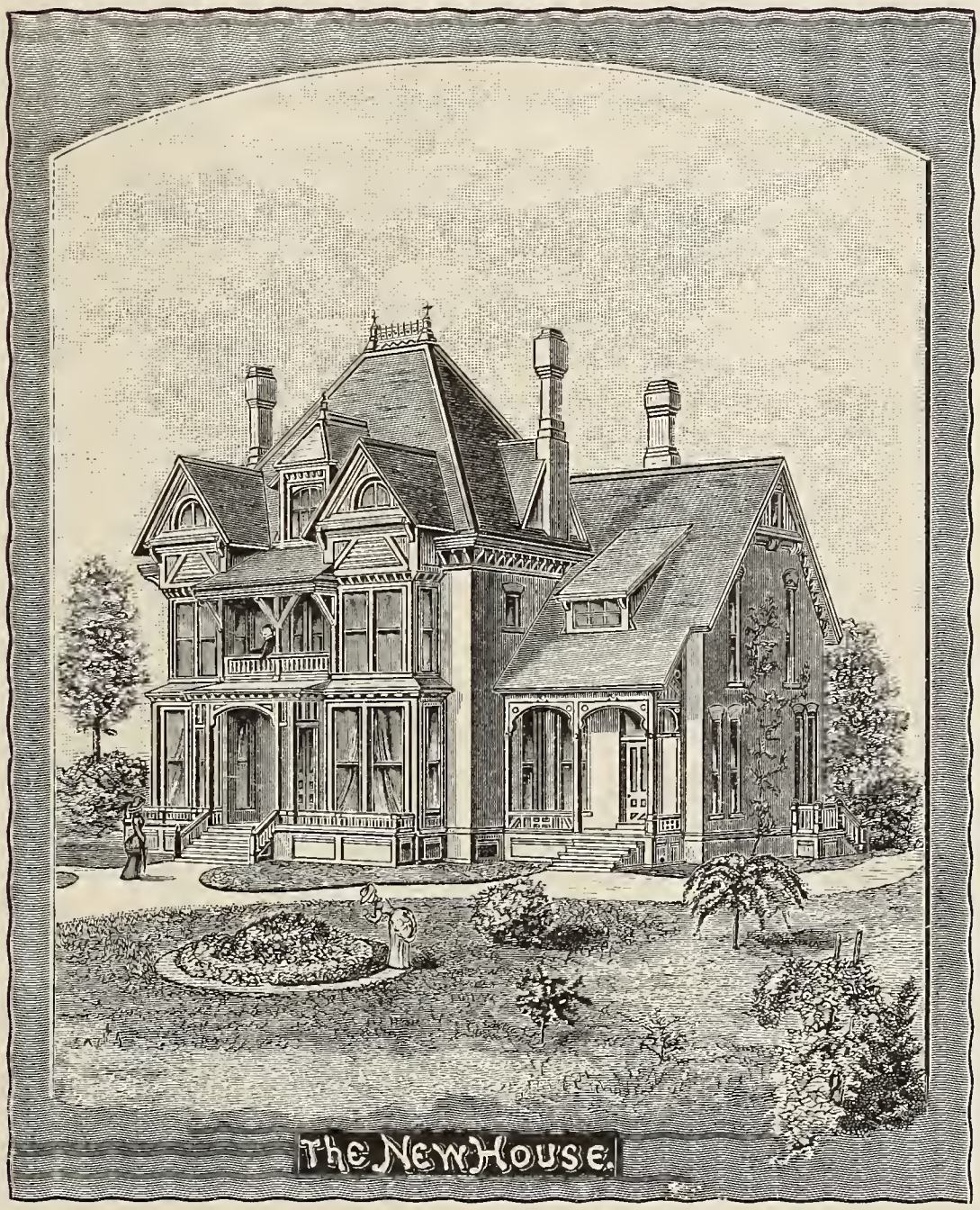
372 N. Paulina st., 1-story cottage, 22x34, $1,000; J. C. Larson.
589 Sedgwick st., 3-story dwelling, 20x58, $5,000; P. J. Gillen.
70 Bryson st., 2-story dwelling, 21x42, $2,000; Z. Samuelson.
137 Wesson st., 4-story flats, 22x50, $5,000; J. Zavier.
Division st. and Ashland av., 3-story store and dwelling, 25x50, $6,000; N. Felz.
191 Canalport av., 2 story dwelling, 20x50, $3,000; H. Milhes.
414 Hurlbut st., 2-story dwelling, 20x50, $2,700; M. Kleinhens.
11 Ashley st., 1-story cottage. 14x30, $1,200; C. J. Hull.
57 Thirty-ninth st., livery-stable, 30x100, $3,000; F. Higby.
992 S. Western av., 1-story cottage, 21x36, $1,200; T. O'Connor.
428 LaSalle av., 2-story dwelling, 21x47, $6,000; W. S. Mellen
Clybourn av. and Halsted st., 3-story store and dwelling, 25x85, $9,000; F. Friedberg.
569 Huron st., 1-story cottage, 20x32, $1,000; George Drolinga.
W. Erie st, 2-story dwelling, 21x48, $2,000; N. Murray.
514 to 518 Van Buren st., 2-story flats, 74x30, $5,000; Dr. E. F. Ingals.
549 and 551 S. Oakley st., 2-story flats, 44x40, $6,000; M. Reittner.
716 Van Buren st., 3-story store and flats, 24x60, $6,500; F. Parker.
451 Jackson st., basement, 20x40, $3,000; Henry White.
651 Ashland av., 3-story dwelling, 22x40, $5,000; Jesse B. Blank.
126 to 136 Curtis st., 3-story factory, 60x100, $15,000; L. Hanson.
586 Center av., 2-story front addition, 30x40, $2,500; J. Sokup.
141 Eighteenth pl., 2-story dwelling, 21x50, $2,800; J. Prokes.
624 Loomis st., 2-story dwelling, 21x40, $3,000; F. Beil.
441 S. Clark st., rear addition, 25x20, $4,500; C. N. Watson.
137 and 139 Hoyne av., 3-story addition to factory, 50x80, $6,000; Seaman, Cox & Brown.
2831 Archer av., 1-story store, 34x80, $4,000; Nathan Davis.
65 Nixon st., 1-story cottage, 22x44, $1,000; J. M. McNichols.
655 Halsted st., 2-story store, 44x60, $6,000; A. C. Baumann.
861 Twenty-first st., 1-story cottage, 20x60, $2,000; Wm. Eigebrecht.
608 Holt av., 1-story cottage, 20x50, $1,000; J. Gegulski.
1890 Lake st., 2-story flats, 22x30, $1,700; R. Janssen.
3528 Dearborn st., 2-story flats, 21x49, $2,700; Wm. Baylis.
Belden av. near Clark st., 3-story dwelling, 24x40, $7,000; D. Himrod.
527 to 531 N. Clark st., 1-story riding-school, 72x150, $22,000; Union Riding Club.
220 Maxwell st., 3-story flats, 22x60, $4,500; G. Hofner.
10 O'Brien st., 2-story flats, 21x40, $2,400; J. Hofner.
Mather and Clinton sts., 4-story store, 40x60, $17,000; Schillo & Cossman.
150 Cornelia st., 2-story flats, 22x40, $2,500; James Youldan
1462 Lake st., 3-story store and dwelling, 21x50, $2,500; George Hensen.
Central Park near North ave., 1-story cottage, 22x40, $1,000; George Potter.
Rice street, near Robey, 10 1-story cottages, each 20x50, $18,000; W. D. Kerfoot & Co.
781 Seventeenth st., 1-story cottage, 20x44, $1,000; John Hess.
414 Taylor st., 2-story store and dwelling, 25x40, $4,500; Catherine Downing.
698 Chicago ave., 1-story cottage, 20x34, $1,000; John Gehnert.
3012 Emerald ave., 2-story dwelling, 22x50, $3,600; Theodore Kaiser.
Larrabee and Center sts., 3-story stores and flats, 110x60, $25,000; Riche & Hibbard.
3814 to 3819 Johnson place, 4 2-story dwellings, 66x48, $9,000; F. D. Reynolds.
2819 Cottage Grove av., 2-story dwelling, 24x50, $5,000; Henry Delaney.
247 Loomis st., 2-story flats, 22x44, $3,500, Oliver Freeman.
564 N. Ashland ave., 2-story dwelling, 22x90, $7,000; John Gerson.
720 Allport st., 1-story cottage, $1,600; John Dusig.
23 Zion place, 1-story cottage, 20x40, $1000; F. Prochosky.
Walnut st., near Parker, 1-story cottage, 21x42, $1,700; W. Halleck.
330 Hermitage ave., 1-story cottage, 20x40, $1,000; Mrs. L Dickerson.
Lincoln st., near Jackson, 2-story flats, 22x58, $4,600; Streeter & Tucker.
Thirteenth st., near Leavitt, 1-story cottage, 22x42, $1,500; M. W. Eilers.
151 Bunker st., 3-story flats, 22x62, $5,200; John Norak.
176 Twelfth st., 3-story store and flats. 24x70, $6,700; N. Traznik.
28 Eagle av., 2-story dwelling, 21x51, $5,000; Mrs. F. A. Hibbard.
3905 to 3909 Lake ave., 3 2-story dwellings, 60x54, $15,000; R. U. Dunham.
2933 to 2943 Prairie ave., 6 2-story dwellings, 125x54, $30,000; O. D Wetherall.
Robey and Twenty-second sts., 2-story store and dwelling, 26x75. $5,000; Henry Valk.
916 and 918 N. Ashland ave., 2-story dwelling, 24x50, $7,000: Kleinke & Henrich.
130 and 132 Twenty-ninth st., 2-story livery stable, 48x95, $12,000; M. Buckley.
19 Margaret st., 1-story cottage, 20x50, $1,200; Mrs. J. Doyle.
210 Walnut st., 2-story dwelling, 21x40, $3,000; J. A. Sackley.
Park ave. near California ave., 1-story cottage, 20x32, $700; Mrs. M. Linton.
255 Lincoln ave., 2-story flats, 20x58, $7,000; H. Schwuchow.
986 Harrison st., 2-story dwelling, 21x42, $3,000; C. H. Case.
689 Twentieth st., 2-story store and dwelling, 25x64, $5,000; Charles Last.
196 Winchester ave., 2-story flats, 25x64, $6,000; John West.
Emerald ave., near Thirty-first. 4 1-story cottages, each 20x38, $3,200; Albert Crane.
337 Orchard st., basement, 20x36, $400; Charles Wolfkuhl.
Ashley st., 4 2-story dwellings, 24x28, $7,000; C. J. Hull.
Fremont and Center sts., 2-story stores and dwellings, 44x50, $6,000; Fred Greisback
Twentieth st. near Oakley, 1-story cottage, 20x34. $700; John Tapper.
1,057 N. Clark st., 3-story dwelling, 25x54, $6,000; T. E. Hickmott.
694 Washington st., 2-story addition to dwelling, 27x46, $2,000; J. B. Chambers.
694 Washington st., 2-story barn, 57x46, $2,000; J. B. Chambers.
159 W. Twelfth st., basement, 20x50, $700; J. Epstein.
73 Maple st., 3-story flats, 25x63, $8,000; E. B. Washburne.
2938 and 2940 Groveland Park, 2-story flats, 44x54, $8,000; John Gallagher.
426 Blue Island ave., 2-story store-house, 24x62, $3,600; Henry Scherer.
615 Loomis st., 3-story dwelling, 23x40, $2,500; Thomas Rall.
443 and 445 W. Randolph st., 3-story stores and dwellings, 48x65, $9,000; A. J. Snell
Rees st., near Halsted, 1-story addition, 23x60, $1,200; B. Roelle.
3536 Emerald ave., 1-story cottage, 20x32, $1,000; J. Wehling.
310 Webster ave, 2-story dwelling, 20x50, $5,000; J. Marshall.
327 Thirteenth st., basement, 20x48, $700; J Harnowski.
1119 Fulton st., 2-story dwelling, 20x42, $2,500; B. A. Hill.
337 N. Carpenter st., 2-story flats, 25x70, $3,000; W. Kubitska.

MILWAUKEE.

Vliet st., Second ward, brick dwelling, $1,400; G. Tannhauser.
Cedar st., Second ward, stone basement, $450; J. Emrick.
Barclay st, Fifth ward, frame dwelling and barn, $1,870; Helms Bros.
Fourth st., Sixth ward, hospital, $30,000; San Franciscan Sisters.
Washington st., Fifth ward, frame dwelling, $800; J. Ahrens.
Holton st., Sixth ward, frame dwelling, $2,500; A. Becker.
Tenth st., Tenth ward, frame dwelling, $1,700; R. Austin.
Twenty-third st., Fourth ward, 3 frame dwellings, $6,500; G. Dunck.
Eighteenth st., Ninth ward, frame dwelling, $1,600; J. Christiansen.
Twelfth st., Tenth ward, frame addition, $400; P. Klusty.
Third st., Thirteenth ward, frame dwelling. $2,400; H. Pringler.
Jefferson st., Third ward, frame dwelling, $1,500; F. Mayer.

The Sanitary News.

Vol. I APRIL 1, 1883. No. 11.



G. P. Randall, Architect.

New Residence of Hon. Reuben Elwood, Sycamore, Ill.

Current Topics.

In his annual message to the City Council Mayor Harrison pays a justly-deserved compliment to the Health Department of Chicago. In speaking of the movement of immigration to and through Chicago he says: It should be remembered to the credit of Chicago that no case was ever passed along, but was immediately removed and cared for. Three thousand six hundred and eleven cases have been reported during the year, of which number 1,055 were treated in hospital. The labor imposed upon the Department of Health in this work alone has been great and of a peculiarly trying nature, but has been so efficiently and quietly performed that our large commercial interests have not been imperiled, our schools have not been interrupted, nor the peace and quiet of our citizens disturbed. There have been 110,915 vaccinations made by the department during the year, and this work also has oftentimes been surrounded by peculiar difficulties.

The City Council in considering the appropriations in committee of the whole has refused to increase the amount applied by the Health Department to scavenger work. Health Commissioner De Wolf asked for $115,000, $35,000 more than was used during the past year, for the reason that the

work of removing ashes and garbage is rapidly increasing. There were nearly four thousand new buildings erected in the city last year; and yet it is proposed that the same number of teams used then shall haul away the additional waste from these buildings. When it is known that two buildings alone in the business district furnish all the ashes in winter that one team can dispose of, the extent of the work can be understood. Ninety loads a day are hauled out of the First ward alone. Besides, it is becoming more and more difficult to find dumping-grounds. Teams have to be driven farther and consequently can do less work. The Council proposes to furnish only $83,000 for this work, which means the use of seventy teams only.

CINCINNATI has come to the conclusion that it is best to end the existence of its Board of Health, and a bill to that end is now pending before the state legislature, an abstract of which is given in another column of this journal. There may be important reasons why the sanitary affairs of the city should be taken out of the hands of the present board, and the creation of a sanitary commission, to be appointed by the courts, with authority to expend a large fund, the raising of which is also provided for, but the proposed final disposition of affairs does not seem to be wise. Ultimately the Sanitary Commission is to merge into the Board of Public Works, a branch of the city government which will always be controlled by politicians and for political purposes. If this is the trouble with the present Board, things will have come to the same pass again when a million dollars, or less, has been expended. A million dollars ought to improve a city like Cincinnati in health and attractiveness wonderfully, but the same emergency for its expenditure that exists now will come again. What the city needs, apparently, is a Department of Health neither subordinate to nor co-ordinate with any other Department if the city government,—that is, it should be separate and distinct, with an officer at its head capable of conducting it properly and clothed with authority limited and restrained only by the laws of the city and state. It is impossible to manage the affairs of a great city by boards economically and justly, as the experience of this city has shown. If Cincinnati has met with an emergency which demands that its streets shall be cleaned and paved and sewers built to preserve the health of its people, let it provide that the same thing shall not occur again, after having set matters right now, by following the example set by Chicago—create a Health Department and put a capable man at the head of it.

CREMATION is being urged in this city, and there is a promise that a building will soon be erected to serve its purposes. It is not expected that incineration will become popular right away, nor that citizens will hasten to die that they may offer up their bodies as a sacrifice to a sensible idea, but there are many in Chicago who are strongly in favor of burning the dead for sanitary reasons. While these are among a class of people who cannot well be spared, it is likely that a crematory would not long remain idle. People are coming quite generally to see the force of the reasoning that the pollution of the soil by decaying human bodies is a very serious matter, and that inhumation must cease that the living may be spared. A company has been organized known as "the Cremation Society of the Northwest," with a capital of $100,000.

THE Chicago City Council has agreed in committee of the whole in considering the appropriations for the ensuing year to add one medical inspector to the Health Commissioner's force; to increase the salary of the Meat Inspectors from $1,000 to $1,200, and of the Tenement House Inspectors from $945 to $1,000. The small-pox hospital was given $20,320, and scavenger work $83,000. The total for the Health Department is $149,465.

AN alderman is on record as saying at a meeting of the Council last week that the talk about dirty streets was "all bosh. The down-town streets were dirty because they were used, and they couldn't be kept clean." This is as sensible as to say that a man could not keep his hands clean because they are used, or an alderman could not preserve his integrity because tempted. There are people—and among them aldermen and city officials—who do not know dirt when they see it; a street bordered and coated with filth suggests to them neither discomfort nor unhealthfulness; and this is one reason why Chicago has mud covering its few good pavements in wet weather and dust rolling from them in dry weather. There is no reason why the streets in the business district cannot be kept clean. An effort was recently made to have the funds for this purpose increased and placed in the hands of the Commissioner of Public Works to be used at his discretion; but this was defeated at once, as it would prove detrimental to the jobbing schemes which can be more readily carried through under the present arrangement.

IN the last number of THE SANITARY NEWS reference was made to correspondence in a Chicago daily from New Orleans, which was plainly intended to discourage the attempt being made in the latter city to construct a system of sewerage. The writer, one Nagle, stated that, two years ago, "under the stimulus of prospective profits a company was chartered, with Mr. Waring at its head and many prominent citizens in the corporation." Nothing was done until latterly "the old company was galvanized into existence again." The writer continued: "Their efforts have thus far been comparatively feebly made, and altogether there is a lack of the vigor and power that were employed in the first instance. On the heels, too, of a threatened suit there comes to us the report of Dr. Thornton, of the Memphis Board of Health, in which the appalling death-rate of that ill-starred city is attributed to the sewerage system in use there. So the ghastly talk of death-traps, sewer-gas, insidious air poisons, typhoid-saturated waters, death, and percentage of mortuary reports have become the theme of conversation and opinion on this subject. It is probable that if the health report of Memphis had been deferred awhile there would have been little or no opposition here to the scheme of the sewerage company. But the ventilation of the palpable fact that stands out so glaringly in the terrible death-rate of Memphis, has alarmed and frightened everybody who is interested in the matter." It is unfortunate that such bold misrepresentations should find a place in the columns of a widely-circulated daily paper. Their influence extends farther than to the New Orleans case, and very much harm may result in preventing younger

cities from adopting not only a system of sewerage which has proved its efficiency, in a sanitary as well as an economic sense, in Memphis, but even any system. The writer quoted claimed to have found the objections to a sewerage system in New Orleans to be as follows: "If sewage is confined as proposed, and disposed of in pipes and reservoirs, the concentration of sewer-gas will become a very dangerous and poisonous element in the houses of this city. The traps that would be used are really traps, for, it matters not how carefully they are made and cared for, they cannot and do not prevent the presence of the insidious ethereal poison of sewer-gas in all places so trapped. The impression also prevails that blood-poison diseases of all kinds would become more prevalent and virulent than ever under the influence of sewer-gas." It is plain that the man knows nothing about the subject upon which he has written, since an improved system of sewerage and house drainage is one of the indications of advancing civilization, and, as has been shown time and again, helps to prolong life and lessen the terrors of epidemics in large cities.

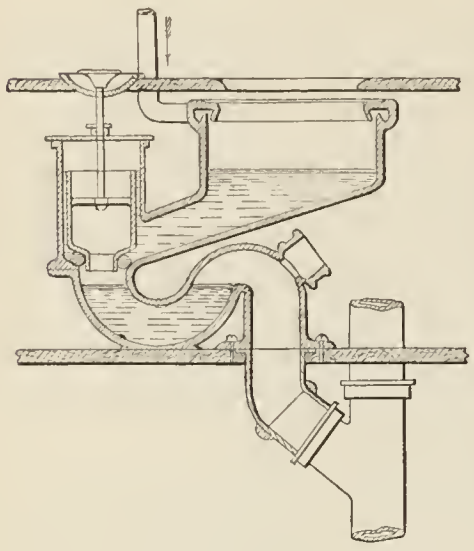
As to the "appalling death-rate" of Memphis, Dr. G. B. Thornton states, in his last annual report, not what is attributed to him above, but that the report that the death-rate of the city has increased since the construction of the sewers, and is attributed to them, is erroneous. In the localities where there were epidemics of such diseases as dysentery and diarrhœa in the past three years—since the Waring system of sewerage was put in,—he says, "there were no sewers, and the prevalence of the disease (diarrhœa) was attributed to atmospheric conditions, and not to any unusual unsanitary conditions of a local character. The zymotic diseases which prevail so fatally in the impure atmosphere caused by sewer-gas, such as diphtheria, scarlet fever, typhoid fever, etc., have contributed very little to the mortality of Memphis during the past three years. For the years 1880, 1881 and 1882 the total number of deaths from diphtheria was 53; scarlet fever, 15; typhoid fever, 45. This is a low death-rate out of a population of 40,000 for a period of three years. I have selected these three zymotic diseases for this period to prove the fallacy of the assertions of those who criticize the death-rate of Memphis so invidiously and seem to attach so much importance to what they are pleased to attribute the evil effects of the sewers."

In response to a request for an explanation in reference to this matter Col. Waring writes to The Sanitary News substantially as follows: "The article from *The Chicago Tribune* written by J. E. Nagle from New Orleans has practically not a word in it about my system of sewerage, nor about the condition of affairs in New Orleans, nor about the state of the public health in Memphis, nor about Dr. Thornton's expression of opinion concerning the same and its relation to the sewerage, that is not absolutely untrue. The last investigation of which I have information, a very recent one, is that of the Dubuque committee which was appointed for the purpose, and which was so well satisfied with the sanitary advantages of the system that it recommends its adoption in Dubuque. The facts about New Orleans are these: Prominent citizens applied to me to make a plan under which the system could be applied there by a private corporation, there being no possibility of raising public funds for the purpose. A most thorough and searching investigation was made. The Memphis system was much abused and this abuse set aside by the reports of two committees which visited Memphis to make the examination. The New Orleans Auxiliary Sanitary Association fully endorsed the the project as did all of the city papers. The Council gave the company everything it could possibly desire as a franchise, and nothing more than was then given has ever been asked; on the contrary, concessions were made to the city by the company. The reason why the scheme was not carried out, and the only reason, was that capitalists, even those residing in New Orleans, would not invest money in any project of which the income would be subject to the jurisdiction of Louisiana courts. Only the other day the Memphis *Ledger* had an article in which it said that the system was so satisfactory that they would not sell it for $1,000,000 unless allowed to replace it. It cost them about $200,000."

An abstract of the new lease prepared by the Chicago Real Estate and Renting Agents' Association is given in another column of The Sanitary News. It should be carefully studied by all who are likely to lease property through members of the Association, as it may save them the trouble and expense of appealing to the law to secure their rights, if they should unwittingly sign one of these documents. The lease might as well be put in these words, to be signed by the tenant alone: "I agree to pay $—— rent per month for the premises in advance, and subject myself to any and all conditions the landlord, or agent, may see fit to impose, regardless of expense or trouble." It is surprising that men who call themselves lawyers, and who are members of the association, and had a part in the preparation of the document, should have supposed that such a lease would be considered binding in a court of justice. There is nothing wrong in requiring a tenant to take proper care of the premises he occupies, but to stipulate that he has received them in perfect order and that he cannot recover damages for some defect in roof, sewerage, or ventilation, which would escape the attention of the most careful observer among ninety-nine men out of a hundred, is absurd. If the wall of a house should fall and cause the occupant loss of life or property, through a defect in the construction, damages could be recovered; it has been shown in recent suits in this city that the same is true of plumbing which is defective, lease or no lease. Murder and arson are none the less crimes because consent is given. There are some provisions of the lease which need to be guarded against, because in the nature of a business agreement. If the tenant finds that his furnace is dependent upon the basement, or hall, for its supply of air for warming purposes, he cannot have a fresh air flue constructed, even at his own expense, without written consent,—and the average agent, or landlord, could not be convinced that it was a necessity and would very likely refuse to give consent. If the tenant saw fit to put in a furnace which did not emit more gas than heat, he would have to leave it in the house when he departed for the benefit of the landlord; and so for "all alterations and additions." It is said that this precious document will be copyrighted.

HOUSE DRAINAGE AS IT IS.

V.



PLUNGER CLOSET.

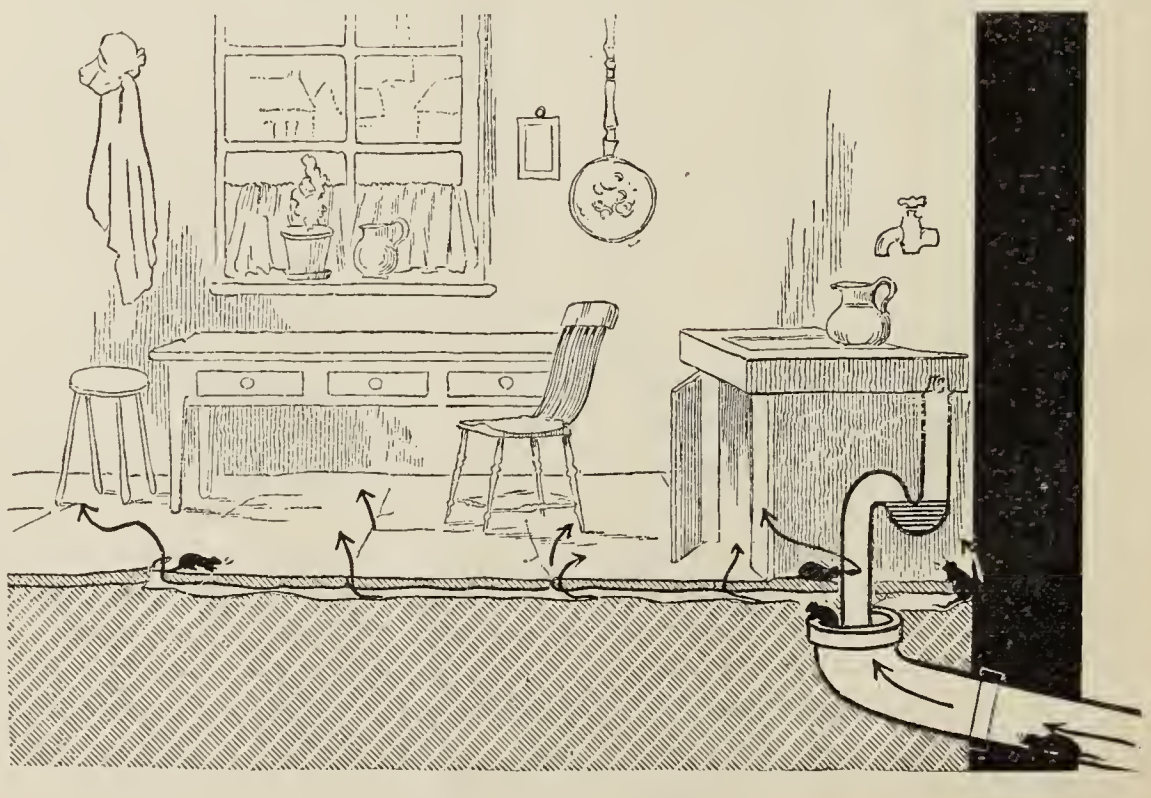
By house drainage, in its broad sense, is meant the entire system of pipes within the house by which the waste of kitchen, sink, wash-bowl and water-closet is conveyed outside the walls of the building. Technically, the drains are the horizontal pipes—sometimes underground and sometimes above it,—which connect with the street sewer at one end and with the pipes which come from sink, water-closet, etc.—waste-pipes and soil-pipes—at the other. They may be of iron, or of vitrified pipe, as explained in previous articles. The work of putting these in position belongs to the drain-layer, whose trade is distinct from that of the plumber, who looks after the vertical pipes. Very much of the bad construction, especially at the point where the work of the two is united, is due to the fact that plumber and drain-layer usually are each prohibited from doing the other's work. In Chicago, at least, there is no law requiring either to make any connection of the waste-pipes and soil-pipes with the drains. The plumber may put his pipes in position, extending them down through the floor, and the other lay the drains without communicating with one another, or without co-operation, at least. It is true that some kind of a connection is usually made between the two systems, and it is often such as was illustrated in a recent number of THE SANITARY NEWS—the soil-pipe thrust loosely into a section of the drain into which a hole has been roughly pecked. It may be still worse than this,—there may be no attempted connection of soil-pipe, or waste-pipe and drain, as shown in an illustration of an actual defect, on page 88 (No. 8) of THE SANITARY NEWS. In this case the lower end of the waste-pipe was more than a foot above the wooden drain, but discharged into the drain through a capacious opening in the latter. Criminal though the work was, no attempt was made to pursue and prosecute the one who was responsible for it; indeed, under the ordinances of the city it would have been impossible to fix the guilt upon any man. Both plumber and drain-layer had complied with the law, so far as his particular part of the work was concerned. The ordinances are very definite about the construction and use of drains, so far as protection to the street sewers is concerned, but hardly go further than that. The most they have to say on this subject is contained in the following extracts:

Section 1363 of the Revised Ordinances provides that all "water-closets and vaults shall be provided with the proper traps, and connected with the house sewer by a proper tight pipe, and shall be provided with sufficient water and other proper means for flushing the same; and every owner, lessee and occupant shall take adequate measures to prevent improper substances from entering such water-closets or privies or their connections, and to secure the prompt removal of any improper substances that may enter them, so that no accumulation shall take place, and so as to prevent any exhalation therefrom, offensive, dangerous or prejudicial to health, and so as to prevent the same from being or becoming obstructed."

Section 1389 provides "that it shall be the duty of every person using, making or having any drain, soil-pipe or passage to connect with any sewer from any ground, building, section or place of business, and in like manner the duty of the owner and tenant of all grounds, buildings and erections, and of the parties interested in such place of business or the business thereat, and in like manner the duties of all departments, officers and persons (to the extent of the right and authority of each) to cause and require that such drain, soil-pipe, passage and connection shall at all time be adequate for its purpose, and such as shall convey and allow freely and entirely to pass whatever enters or should enter the same."

Section 1391 requires "that the proper officers and authorities shall, to the extent of their power and ability, cause the sewers and drainage of said city to be so well located and constructed, so adequate in size, and to be so kept in repair and cleaned, and so adequately supplied with water, and with such proper arrangements and constructions in every particular, that life and health shall not be needlessly exposed, or suffer unnecessary peril or detriment by their neglect, or by reason of the defects or deficiencies of any sewers or drainage, or the want thereof."

This last section comes nearest to covering the point under consideration, and under it a landlord may be prosecuted for permitting his premises to remain in a condition which will endanger the "life and health" of tenants; indeed, it has been recently done, and in a suit brought by Mrs. Georgiana Pierce, as reported on page 99 (No. 9) of THE SANITARY NEWS, she was awarded damages in the sum



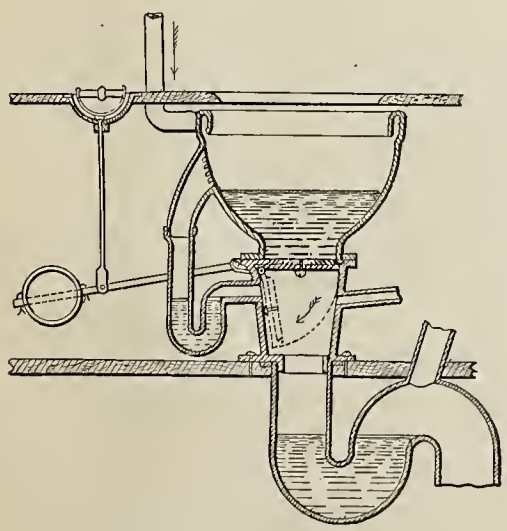
RATS AS SANITARY INSPECTORS.

of $1,000 against the agents of the property. But this does not get at the root of the matter, by requiring perfect work at the outset. The Department of Public Works licenses drain-layers and has a set of rules and regulations with which they are supposed to comply, but the city does not afford means for employing a sufficient number of inspectors to examine their work before it is hidden from sight, and the "regulations" say nothing about uniting the two systems of pipes. The Health Department has authority to a certain extent over the plumbing, and can reject all plans that are not satisfactory; but that Department has no means of knowing positively and invariably whether they are properly carried out. Under such circumstances, plumber and drain-layer would be more than human if they erred, especially if paid to do so by a house-builder who is ignorant of the first principles of sanitary house-building.

In this connection it will be of interest to reproduce an illustration which first appeared in an English book, showing how rats may help to introduce the foul gases of the drains, or sewer, into the house—although the basement floor may have been made of stone and cement,—if the connection between waste-pipe, or soil-pipe, and drain is defective. Prof. Huxley recently related an experience with rats in his own house. It had been reported to him that rats were in a particular room in the basement. They came from the sewer. "He had," the report of his remarks continues, "the floor of the room at once taken up, and a very curious state of things had revealed itself. When the house had been built a particular drain of an unimportant character had been designed to lead out in a certain direction. It had afterward been laid in another direction. The business of the builder and of his workmen naturally should have been to close up the drain in the one direction which had been finished and to carry it out in another way. That had been done with a degree of carelessness and neglect of common precaution which was absolutely criminal. The bricklayers had not taken the trouble to shut up a small opening of the drain. For twelve years there had been in the house that connection between the sewer, the drains, and the basement of the house, which, had it not been for the rats, would have been impossible to have been discovered even by the most careful of inspectors."

DANGERS IN DIRT.

II.



VALVE CLOSET.

Air is not the only nor even the chief medium through which danger from organic filth is incurred. Water is the favorite vehicle by which it finds its way into the human system. The water may be clear, sparkling, and in no way repulsive to the taste or smell, and yet harbor the seeds of disease and death which have found their way into it from a neglected vault, a cesspool, a barnyard, or even a heap of garbage upon the surface. The fluids from these sources, percolating through the soil, find their way into the underground rivulets which furnish our water-supply, and thus the work of mischief is done. The idea that the earth disinfects everything which passes through it is a mistaken one. Earth chiefly absorbs and holds the filth which comes in contact with it, the proportion of filth destroyed being very small. The first portion of water passing through may be disinfected, but the second will be pretty certain to pass unchanged if impure, or to be contaminated if pure. I have here two portions of fine earth, one of which has been used as a filter for contaminated water. To all appearance they are exactly alike, no difference in color or odor being distinguishable. I will place each upon a filter and pass a little water through. You observe the water runs equally clear from each; but let us apply the same test which we applied to the breath a few moments ago. Adding to each a portion of this purple solution, drop by drop, we find that in one the color is retained, increasing in density as each drop is added, while in the other the color temporarily produced by each drop disappears before another is added, proving the presence of organic matter. This experiment teaches us three lessons: (1.) That earth is not a disinfectant in the sense in which it is usually supposed to be—that it does not destroy, but simply absorbs and conceals organic filth. (2.) That earth which is thus saturated may appear to be innocuous when really filled with the most concentrated poison. (3.) That water containing a considerable quantity of organic matter may so closely resemble pure water that it cannot be distinguised by its physical properties. These are three important practical points which ought to be indelibly fixed in every mind. Who cannot recall dozens of instances in which the family water-supply of a village or community has been so located as to make the well a veritable cesspool, draining, through underground channels, the garbage heap, the privy-vault, the depository of house slops and kitchen waste, perhaps a barn-yard and a pig-sty? All of the filth is apparently upon the surface and in the estimation of most persons is productive of no greater harm than a bad smell; but a porous soil makes an immediate connection between the deposits of filth upon the surface and the water supply many feet away and deep below the surface of the ground, converting the fountain of life into an agent of disease and death. Hundreds of epidemics of typhoid fever have been traced directly to contaminated well water. Indeed, so constant is the connection between the disease named and a polluted water-supply that every intelligent physician looks at once to the well as the cause when he discovers a case of typhoid fever; and a form of the malady has even received the name of "cess-pool" fever, so obvious is the connection between the disease and its cause. We might with equal propriety name individual cases of the disease, "barn-yard" fever, "garbage-heap" fever, "pig-sty" or "hen-coop" fever, etc., according as the source of filth may be.

The most dangerous of all forms of dirt still remains to be considered, that form known to scientists by the term germs. These microscopic organisms were first discovered by the father of microscopy, more than two centuries ago. Their discoverer did not appreciate, however, their significance, and had no conception of the immense *rôle* which they play in the economy of nature. Indeed, it has only

been in the most recent times that the investigations of scientists and the observations of physicians have developed what is known as the germ-theory of disease, and revealed the true nature of these minute objects so insignificant in appearance, and yet so infinitely potent for harm. Most important of all the numerous classes of microscopic beings are the bacteria. The smallest of all living things, mere specks of life even when viewed by the aid of the most powerful microscope, these infinitesimal creatures are responsible, according to the most recent researches of European savants, for more disease and death than all other enemies of the race combined. Commissioned by nature to the work of scavengering, removing the dead bodies of plants and animals, they are always present where decay is taking place, performing their part in executing the sentence of the Almighty, "Dust thou art and unto dust shalt thou return." Every decaying vegetable, every decomposing carcass of man or brute, every form of fermentation or decay, is the scene of the activities of these little creatures; and if we could see with our unaided eyes their operations, we should behold in every speck of putrescent matter millions of bacteria holding high carnival, feasting like vultures upon the dead bodies of the slain, after a recent battle. So long as they confine themselves to their legitimate business, they are harmless—yes, even benefactors, since they help to clear away the rubbish of one generation to make way for the succeeding. But, unfortunately, like hungry wolves, ever voracious and unsatiated, and emboldened by the magnitude of numbers or the advantages of opportunity, they often seize upon us before Nature's summons for us to "go the way of all the earth" has been properly served, and subject us to a premature execution. Ever watchful for a favorable opportunity, they attack us in our weak moments, when overcome by fatigue or weakened by excess, or when Nature is off her guard, and capture the citadel of life almost before the doctor has time to make a diagnosis of diphtheria, or typhoid fever, or epidemic dysentery, or yellow fever, or, as some will now say, of consumption or scrofula.

A few years ago the Health Officer of the city in which I reside, brought me a specimen of water from a well which was very extensively used, and which supplied the water for drinking and cooking purposes to a large eating-house. Within a few months, seven cases of typhoid fever had occurred among the regular patrons of the house. An examination of the premises developed half a dozen old privy-vaults within an area of a half-dozen rods, and the whole soil for many rods about was completely saturated with excreta. On making an examination of the water, chemically and microscopically I found all the evidence of a high degree of contamination. Germs were abundant and lively, and the only wonder was that all who partook of it had not succumbed to its noxious influence. I might detail many similar cases, and cases innumerable might be cited from the medical and sanitary literature of the day.

Germs and noxious gases are almost always associated, a fortunate fact, since it enables anyone whose olfactory sense is not too obtuse, to detect the dangerous proximity of these enemies to life without the aid of a chemical or microscopical expert. Nature has placed at the threshold of danger a bad smell, as a signal to warn us of an impending evil. An odor of putrescence says to those who are wise in a sanitary sense: "Look out for germs!" and the friendly warning should be instantaneously heeded. With every breath drawn in such an atmosphere, millions of these voracious creatures are carried down into the lungs, where they are brought into almost immediate contact with the blood, into which they readily find their way and begin their work of devastation.

I want to say just one word more about another source of air contamination by which both gaseous and organic filth are projected into the unwilling nostrils of thousands of people every day. I refer to the tobacco habit. We hear much about the opium habit and the liquor habit and now and then a word about the tobacco habit, but the most that we hear about the latter is respecting the baneful effects upon the user of the filthy weed. I mention it in company with other causes of bad smells as a nuisance. What greater right has any man to poison and render nauseous and repulsive the air which I breathe more than to poison or contaminate the water which I drink. In this Republican country, we hear a great deal about the "inalienable rights" of human beings; and not many years ago there was a fierce political contest over the question whether the negro should be allowed to enjoy his inalienable right to vote. Which is more sacred and more important for a human being—the right to cast a bit of paper into the ballot-box, or to breathe the free air of Heaven in the same state of purity in which the Creator prepared it for man? Who has ever been granted the right by Act of Congress or otherwise willfully to pollute the life-giving oxygen made free for all? Did any of you smokers ever attempt to imagine the felicity of a lady or gentleman, to whom the odor of tobacco is sickening and most repulsive, following in your wake on a still summer evening, while you puffed with self-complacency and intense satisfaction the, to you, fragrant Havana? Or did you ever endeavor to print in your own imagination the delightful sensations which must be experienced by a sensitive man or woman who has never offered incense to the smoky god when compelled to ride in a close cab on the seat opposite or beside you, while you rolled between your lips the stump of a cold cigar. Please put yourself in that man or woman's place and see if you will not decide with unhesitating promptness that the tobacco-user is a nuisance, which should be abated.

Tobacco smoke is excellent in its place like other forms of dirt. I set an old smoker agoing in our conservatory the other day with good effect. Every living thing that was able to travel left for parts unknown and the few that were unable to get away died of nicotine poisoning—all except the smoker himself, who was tough and nicotine-proof. I can recommend tobacco to kill vermin of all kinds, except a kind of parasite that breeds in bar-rooms and billiard-halls, and may often be seen adhering to lamp-posts, hovering around street corners and railway stations, or paying his respects to the aboriginal smoker who stands in effigy before the door of every first-class tobacco emporium, inviting these students of archeology to walk in and repeat the experiment described by Christopher Columbus when he wrote in his ship journal, "we saw the naked savages twist huge leaves together and smoke like devils,"—not a very interesting experiment it would seem, but one which possesses such a strange fascination that since this description by Columbus

nearly the whole civilized world have been following the example of those naked savages.

But I must forbear, lest I wound the sensibilities of some of my brother sanitarians who regard fumigation as one of the best means of preventing the spread of small-pox contagion, especially when performed by means of choice brands, stimulated in their combustion by persons who have been well vaccinated. Personally, however, I must confess a preference for an occasional exposure to small-pox rather than perpetual fumigation with nicotine. Science, as well as common sense and an unperverted olfactory sense, says tobacco is not only unnecessarily but positively harmful; and I doubt not that the sanitarian of the future will as soon think of inhaling the fumes of asafetida or coal tar, as the smoke of tobacco leaves.

J. H. Kellogg, M. D.

Court House at Burlington, Iowa.

DESCRIPTION OF THE BURLINGTON COURT-HOUSE.

The illustration on the previous page shows the finest court-house in the State of Iowa. The building is 103x107 feet in size, and the extreme height of the dome is 160 feet. The basement is 16 feet high, and the first and second stories each 20 feet. The exterior walls are built of Clough's buff sand-stone from North Amherst, Ohio. There are no wood joists in the floors, the beams being of rolled iron from Pittsburgh. Corrugated iron arches span the beams on which is concrete, on which the floors of black and white marble are laid. All wainscotings, base, window-stools, court-room rostrums, judges' stands, mantels and portico columns are of marble, furnished by a Chicago firm. The roof is of tile laid in cement on corrugated iron. The corrugated iron was furnished by Knisely & Miller of Chicago. The truss work of the roof and the dome is of iron, also supplied from Chicago. The window and door frames are of iron, thus making the building thoroughly fire-proof. Special attention was paid to the plumbing and steam-heating, the work having been done by Stewart & Hayden, of Burlington. In this respect the building is perhaps the best in the State, the firm named having been given authority to spare no pains, and being sufficiently paid to do a good job. The structure was recently completed and is handsomely furnished and frescoed. It was designed and superintended by Perley Hale, Architect, of Burlington. The total cost of the building was $103,000. It is one of the signs of progress in sanitary building that attention in this direction should be given to a structure of this nature.

THE CHICAGO RENTING AGENTS' NEW LEASE.

The new lease prepared by the Chicago Real Estate and Renting Agents' Association provides that the tenant has examined and knows the condition of the premises he rents and has received them in good order and repair, and that no representations as to their condition or repair were made by the agent prior to or at the time of the execution of the lease that are not contained in or indorsed on the document. The tenant promises that he will keep the premises in good repair; will replace all broken glass with glass of the same size and quality as that broken, and will keep the premises and appurtenances in a clean and healthy condition, in accordance with the city ordinances and the directions of the proper public officers during the term of the lease at his own expense, and at the termination of his lease will yield up the premises in good condition and repair, loss by fire or ordinary wear excepted.

It is provided that the agent or landlord shall not be liable for any damage occasioned by failure to keep the premises in repair, nor for any damage done or occasioned by or from plumbing, water, gas, steam, or other pipes, or sewerage, or the bursting, leaking or running of any cistern, tank, washstand, water-closet, or waste-pipe in, above, upon, or about the building or premises, nor for any damage occasioned by water, snow, or ice upon or coming through the roof, skylight, trap-door, or otherwise, nor shall he be liable for any damages arising from acts or negligence of co-tenants or other occupants of the same building, or of any owners or occupants of adjacent or contiguous property. The tenant shall, without injury to the roof, remove the snow and ice from it when necessary and clean snow and ice from the sidewalks in front of the premises.

The tenant shall not allow the premises to be used for any purpose that will increase the rate of insurance, nor for any purpose not specified in the lease, nor to be occupied in whole or in part by any other person without in each case the written consent of the lessor; he shall not permit any transfer, by operation of law, of the interest in the premises acquired through the lease, and will not permit the premises to be used for any unlawful purpose, or purpose that will injure the reputation of the premises, or of the building of which they are a part, or disturb the tenants of such building or the neighborhood. He shall not permit them to remain vacant or unoccupied for more than ten consecutive days, and will not permit any alteration of or upon any part of the premises, nor allow any signs or placards posted or placed thereon, except by written consent of the lessor; all alterations and additions to the premises shall remain for the benefit of the lessor, unless otherwise provided in the consent referred to.

The tenant is required to pay (in addition to the rents otherwise specified) all water rents and gas bills taxed, levied or charged on the premises during the time for which the lease is granted, and in case no water rents are levied specifically upon the premises to pay the —— part of all water rents levied or charged upon the building in which the premises are situated. In case the water rates and gas bills shall not be paid so soon as due the lessor shall have the right to pay them, and add the amount, together with any amounts paid by the latter by reason of notice from the proper authorities to keep the premises in a clean and healthy condition, to the rent of the premises, payable with the first installment of rent due thereafter.

PROPOSED ADMINISTRATION OF SANITARY AFFAIRS IN CINCINNATI.

A bill is before the Ohio State Legislature providing for a radical change in the administration of sanitary affairs in certain large cities in the State—cities of the first grade, practically, Cincinnati. As it is believed the bill will become a law an abstract of it is here given:

The trustees of the sinking fund in the cities specified are authorized to borrow not exceeding $1,000,000 to be used as the Board of Street and Sanitary Commissioners shall specify. The fund thus to be created shall be designated the street and sanitary commission fund, and all moneys now to the credit of the sanitary or board of health fund, the street-cleaning or the street-repairing fund, shall be transferred to this fund.

In all such cities there shall be a Board of Street and Sanitary Commissioners, composed of four members, to be appointed by the superior court, or the court of common pleas of the county, for the term of two years. As compensation for their services each member shall receive not exceeding $5 for attendance at any meeting.

The board may employ and discharge such superintendents, engineers, clerks, laborers and other persons as it may deem necessary, prescribe their duties and fix their salaries and compensation.

The board shall exercise all the powers vested in municipal corporations for the suppression and abatement of nuisances and for the preservation of health, and shall have power to make such orders and regulations as it may deem necessary for the public health and for the prevention of diseases, and in such cities there shall be no board of health. The new board shall have charge and control of the cleaning of the streets, alleys, avenues, roads, lanes, and other public highways, public squares, wharves, market-houses and spaces, bridges, sewers, drains, ditches, culverts, slips, canals, streams and water-courses which are in and under the control of the corporation; and, also, of the repairing of all such streets, alleys, avenues, roads, lanes, and other public highways, public wharves, market-houses and spaces, including curbs and gutters. To facilitate the board in the performance of its duties, all buildings, stables, animals, vehicles and implements of every description now used for any of the purposes specified shall be turned over to it. The board shall have power to do all such work by day labor or contract.

The board shall have power to re-pave any and all streets, lanes, alleys and other public highways, spaces and grounds, including the setting of necessary curbs and gutters, whenever the board shall deem it necessary. It shall have the power to order the construction and repair of all sidewalks, including curbs and gutters, which it shall deem necessary, and shall have all the powers of council, board of improvements board of public works and city commissioners in respect to sidewalks and including the assessments therefor.

No street, alley, lane, public highway, market-space or public ground shall be broken up for the laying of gas, steam, water or other pipes or sewers, nor for any purpose whatever, unless permission has first been given by the board in writing.

All expenditures necessary to enable the board to sustain and carry into execution the provisions of the act shall be paid from the street and sanitary commission fund.

Ultimately the board shall consist of five members who shall be the persons elected members of the board of public works of the city.

THE HOUSE INTERIOR.

In a recent article on window decorations the writer very sensibly insists on "uninterrupted access to the windows." Windows are intended for use, and when they are shrouded in heavy lambrequins, and two or three sets of curtains, or when tables covered with bric-a-brac, or ponderous chairs and easels, are placed in front of them, they become of little value except to show to the passer-by in the street the richness and elegance of the house furnishings. Leave the windows free from all cumbersome ornament, so that one can draw a chair close up to it, to feel the health-giving warmth of the sunshine, or to enjoy the changing clouds, or the last fading glories of sunset. If the narrow spaces of city streets cut off the sky view so that it offers little attraction, the unobstructed window is still needed to let in a supply of light and air. The old days of dark drawing-rooms, when the visitor hardly dared to sit down for fear of demolishing some pet trifle, have happily gone by, yet many city housewives still draw the shades and keep the front rooms in a state of shadowy gloom. A candid soul, when asked the reason of this singular practice, admitted that it was to hide the dust where an unfaithful servant did not, and she would not take the requisite pains to keep the rooms clean; there is ample evidence that she is one of a numerous sisterhood. A lover of sunshine, moving into a house recently, objected to the dark hall, and was only reconciled to it by the promise of a window cut in the wall over the stairs. But when the thick, painted curtain of a dull lead color, which the former occupant had left, was removed from the window over the street door, and with it the unseen dust of years' accumulation, such a flood of light poured in that the question became that of an awning instead of an additional window.

* * *

At a recent sale of foreign pictures in this city, there were two frames which were so unique in decoration, and so new in design that they attracted much attention. On a bronze ground were arranged vine sprays and leaves in the shades of gold, silver and bronze in relief, having the metallic lustre and finish. This work is the result of a new process which the French call *Sylvain-Decor*, and is an application of electro-metallurgy invented by Mr. Juncker of Paris and patented in France, England and the United States. The process consists of fixing a branch of natural leaves, a fern, or any plant form on a surface of some kind, and covering it with a thin layer of metal, beneath which the plant remains and is preserved. The background may be of wood, stone, metal, cloth, or almost any surface, and the possibilities of ornamentation are as varied as the forms of plant life. This work may be applied to decoration in numberless ways, being especially good for wall spaces, door and screen panels, and chimney-pieces. If the flowers or plants are well selected and grouped, and metallized in tints of gold, bronze or copper, this form of decoration can be made extremely beautiful and artistic. The artist Munkacsy owns a screen of five panels which is elegantly decorated in this manner. Palms, brambles, ferns and grasses are grouped on the panels in all the harmonizing metallic tints. Of course the different objects are in greater or less relief and show the curves and graceful arrangement, and the lines and veinings of the imprisoned plant.

* * *

At the store of the Tobey Furniture Company is a bedroom set made almost entirely of cane and straw. The little wood that is absolutely necessary is maple, and it appears in the frames in narrow strips between which are lines of straw of equal width. Bedstead, dressing bureau and tables are all of cane of fine quality and woven as in the ordinary chair. A sofa and chairs of various sizes complete a set, of thirteen pieces, which is unique in design and by no means inexpensive. It is intended for a country house, but would be beautiful and serviceable anywhere, and would give its owner untold satisfaction in comfort and cleanliness, and the certainty that it would bear the most constant use without injury. When the time comes for a reaction from the massive furniture and heavy draperies which are now in such high favor—and it must come sooner or later—it will give the rattan and cane furniture an increased popularity, and simplify still further the problem of healthful, comfortable furnishing.

* * *

Miss Adelaide Johnson has in her studio some fine specimens of wood carving, all of which are from her own designs. A corner cabinet of amaranth has a continuous design on the two doors showing a tree branch on which a large bird with wings spread is seen reaching forward to catch a butterfly. Another cabinet of black walnut has sunflowers and lilies carved in relief and a border of conventional design. An antique-looking chair has an excellent carved decoration. Some picture-frames show ferns and vine-sprays copied directly from nature and done with pleasing breadth and freedom. A mantel front, designed to take the place of a grate in summer, is of unstained cherry with a cluster of calla lilies on a central panel in relief and undercut so that blossoms and stems stand away from the background. Around this is a border of wood with rushes and vines. Miss Johnson's decorative work has a *raison d'etre* and a fitness which give it more than ordinary artistic excellence.

* * *

At a room in the Central Music Hall Building there are some rare and curious old hangings, which are said to have been brought from a mosque at Mecca. A lambrequin, which is thought to have formed the drapery behind an altar, shows the outline of the Moorish arch in the center with long straight lengths on each side. The foundation is a crimson silk damask, the figure of which has been nearly worn off. It is covered with sentences from the Koran worked in heavy embroidery of gold, silk and tinsel, and bordered with a curious scroll-work design. A spread of like material and design belongs with it. A set of curtains of red silk bordered with green is covered with similar characters, and graceful scrolls in the same embroidery. These pieces are of undoubted age, and have in them rare suggestions for decoration. The lambrequin fits a large doorway and would form an appropriate and artistic introduction to an oriental room.

* * *

There seems to to be a demand for some variation of form in that very necessary article of furniture the sofa, and it has been suggested that some form of a hammock might be utilized for this purpose. A stuffed sofa is heavy, cumbersome and in summer warm and uncomfortable. A hammock is cool, easily adjusted, and beautiful. It can be made of material which is both strong and attractive in color, and fastened to the wall or mounted on a frame of wood. It has great possibilities of decoration and is very picturesque. An advocate of some hammock form for house use says: "Every caterpillar shows us, summer after summer, how to be happy while resting in mid-air, yet no one has ever knelt at the feet of the humble worm and taken his hint of a silken sling."

* * *

For those who desire inexpensive furniture coverings there is nothing more satisfactory than cretonne. The English and French fabrics are soft in finish and durable in color, showing either a corded or a rough crapy surface. Some of the new designs are excellent. One has, on a dark ground, a Gobelin tapestry pattern in dull colors. Another shows great passion flowers on a cream or pale pink ground. Many of the patterns suggest the intricate calico designs of fifty years ago, and one, a curious intermingling of floral and geometrical forms, is copied from an old French wall paper. As in papers the olive shades form very effective backgrounds, and are soft and warm in tone, and, in the better qualities of cretonne, bear the most constant use without fading.

* * *

Polished brass plaques have been very much in demand recently in the Eastern cities. The plain brass disc is surrounded by an ornamental border of a lighter tone and with little polish. They are made in sizes from six to eighteen inches. They are treated with painted decorations which, if broadly done, may be made very effective. For many uses, the plain metallic surface without decorations is excellent. Bronze and zinc are also used for these plaques, but they are less satisfactory than the brass, the bronze having the appearance of an imitation, and the zinc strongly suggesting an old pewter plate.

* * *

The new furniture shows little variation from that of last year, the old shapes still being in demand, and reproductions of French, Dutch and Italian styles being included in the general designation of Renaissance. Some dealers report mahogany, cherry and oak as the woods most in demand, while others are using walnut almost exclusively. It is prophecied that woods of light color will succeed the dark varieties in popular favor. A radical change both in shapes and material is one of the predictions regarding next year's furniture.

THE newest picture frames show the receding Florentine shape or a modification of it, called, as everything else in decoration which has no distinctive name is called, Renaissance. The colors run through all the metallic tints, bronze and copper being the most popular. Each picture has its separate rod, either of wood to match the woodwork of the room, or of brass, and is hung by two brass chains. For large pictures this new method of hanging is excellent as it insures strength and safety.

* * *

THE South Kensington Museum has lately received two valuable additions to its art collection. The Jones bequest consists of a rare collection of old French furniture, fine specimens of China and ormolu work and many books and pictures. The collection numbers 858 objects and is valued at £300,000. The other collection was made in India by Mr. C. Purden Clarke, and includes a large variety of examples of the domestic architecture of the natives.

* * *

BEDSPREADS and pillow shams of hem-stitched linen handkerchiefs joined by rows of antique lace or strong woven insertion, and finished with a corresponding edge, are novel and pleasing. The sham which is made in one piece long enough to cover both pillows is an improvement on the old fashion, being more easily adjusted and kept in place.

MARTHA HOWE-DAVIDSON.

IMPERFECT PLUMBING AND THE RESULT.

It is reported that diphtheria and scarlet fever attacked the family of James S. Rockwell at No. 4, Montague terrace, Brooklyn, in the fall of 1878; Mr. Rockwell's granddaughter died in December of that year, and the grandson, who was named after him, barely escaped death. Mr. Rockwell himself died of diphtheria in January, 1879, after a few days' illness. It was ascertained after his death that the traps of the wash-basins in his bed-room and in his private bath-room had been sucked out, and thus afforded vents for the sewer-gas. The facts are recalled by the recent death of Mrs. Rockwell. It is said that Mr. Rockwell, who constructed the house, spent a fortune upon it to make it exceptional in a sanitary point of view, but it was subsequently discovered that the plumbing-pipes formed the apex of the Furman street sewer, and served to ventilate the whole sewer system with which they were connected. It could not have harmed anybody, had the pipes and drains been properly constructed and themselves ventilated above the house, even though they served as an outlet for the gases of the sewer.

A PLEA FOR PLUMBING LAWS.

Much of the plumbing done in Toronto is very poorly done. When new houses are erected the result of bad plumbing is very unsatisfactory to the occupants, and in many cases leads to sickness and death. From a sanitary point of view it would be well for the plumbing done in Toronto to be controlled by legislative enactment. Plumbers should be required to submit themselves to an examination, and show that they are capable of carrying out their contracts in a proper manner. The best way to do would be for all plumbers to lay the plans of the plumbing to be done in new buildings before the City Commissioner—before whom the plans of all buildings should be laid—so that the sanitary necessities of the city could be supplied, and the health of the people protected from fevers caused by bad drainage and imperfect plumbing.—*Toronto Telegram.*

AN ENGLISH PLAN FOR WARMING AND VENTILATION.

According to *Engineering*, the supply of air for the new Royal Courts of Justice in London will reach nine and a quarter millions of cubic feet per hour. It will be drawn from the areas surrounding the great hall, and freed from dust and smut by being passed through a fine water spray. The withdrawal of the vitiated atmosphere is accomplished by means of powerful steam coils placed in the ventilating shafts, to which access is given by numerous openings in the ceilings and galleries. To cool the air in summer, as well as to circulate it, an ether refrigerating machine has been erected in a crypt under the four angles of the great hall, consisting of a pair of engines, vapor-pumps, refrigerators and condenser. This machine is of sufficient power to reduce one thousand gallons of water per hour from 70 to 40 degrees Fahrenheit. The water thus reduced can be converted into fine spray by an "atomiser," and the air passed through it. The cold water that is not absorbed is collected in a cistern, and conveyed to the condenser, where it is used to abstract the heat given off by the ether in liquefying, and is finally allowed to escape at a temperature of 90 degrees.

OVERWORK AND WORRY.

Every one has seen the victims of overwork and knows that the persistent, untiring application to business wears men out. It may not be the work alone; there is technical truth in saying that worry, not work, is the most serious danger; or that dry air or physical neglect help on the trouble. But this is mere quibbling, for there are few who can work actively and continuously without some worry or neglect of sanitary rules. The conditions of our life require that Americans should be more than ordinarily active and industrious, but, all the same, we should be a happier and a healthier people for a little more of the gospel of recreations. The lazy may seize this as an excuse, but our sanitary evangelists must say that their gospel does not apply to the lazy, who in America are greatly in the minority.—*The Medical Record.*

APPLE JELLY.

The Cleveland Herald is authority for the following: "Certain firms in town have been known to buy rotten fruit, especially apples, for twenty-five cents a barrel. These apples have been seen to enter the manufactories, and all that came out were mincemeat, jelly and fruit butters. No process can be used by which the injurious properties in decayed fruit can be destroyed. These jellies are sold in the usual glass tumblers, two dozen in a case, for about $1.40 to $1.75 per case, wholesale, or for less than 6 cents to 7¼ cents per tumbler, including cases and glasses. In pound quantities, the condiment is sold for 8 to 8½ cents, according to quantity. Mincemeat brings 8 cents a pound, apple butter about 7 cents, and peach, apricot and other fruit butters about 10 cents. These prices are so manifestly below those of the genuine article as to carry the evidence of adulteration on the face of it."

CURRENT PUBLICATIONS.

"THE POPULAR SCIENCE MONTHLY."

The April number of this monthly contains a portrait and biographical sketch of Increase Allen Lapham, who replied, when asked in what department of science he was laboring: "I am studying Wisconsin." "The Nature and Limits of the Science of Politics," is discussed by Professor Sheldon Amos; "The Economic Function of Vice," by John McElroy; "The Census and the Forests," by N. H. Egleston, and among other articles of interest are "Origin of the Donkey," "Speculations on the Nature of Matter," "Origin of the Calends and Astrology," and a discussion of "Incentives to the pursuit of Science," by the editor.

"SCIENCE."

This valuable weekly scientific journal has a series of interesting articles on the "History of the Application of the Electric Light to Lighting the Coasts of France."

"THE INLAND ARCHITECT AND BUILDER."

The first number of this journal, monthly, has made its appearance in this city. It will be devoted to architecture, construction, decoration and furnishing in the West. It presents a pleasing appearance typographically, and gives promise of doing good work in its field.

"HEATING AND VENTILATION."

This is a popular and scientific treatise, "compiled from the writings of the highest authorities on this subject, and prepared especially for the use of school boards." After giving the composition of atmospheric air and explaining its natural movements, the condition of the ordinary school-house with reference to its ventilation, or lack of it, is discussed. The Ruttan system of ventilation is explained at length with its application to the school-room. The book is very handsomely printed, and is dedicated to the teachers and school-boards of America, "with whom the author has, during a period of more than twenty years, had a pleasant acquaintance." Published by Oliver Adams & Co., Chicago.

BOOKS AND PAMPHLETS RECEIVED.

"Sanitary Suggestions." By Irving A. Watson, M. D., Secretary of State Board of Health, Concord, N. H. Read before the New Hampshire Medical Society at its annual meeting, June 20, 1882.

"Heating and Ventilation." By Oliver Adams, author of Adams' System of School and Township Records. Illustrated. Price, 50 cents. Chicago: Oliver Adams & Co.

"The Death Rate of Memphis." By George E. Waring, Jr.

"Concerning Mr. Rudolph Hering's Project for the Sewerage of Binghamton, N. Y." By George E. Waring, Jr.

"The Prevention of Insanity." By Nathan Allen, M. D., Lowell, Mass.

"Annual Reports, 1882, Department of Health of the City of Charleston, S. C." H. B. Horlbeck, M. D., City Registrar and Secretary Board of Health.

"The Death Rate of Memphis." By G. B. Thornton, M. D., President Memphis Board of Health. To which is appended a circular on the Waring Sewer System, by Major J. H. Humphreys, engineer in charge of sewers.

"Third and Fourth Annual Reports of the Board of Health of Memphis." By G. B. Thornton, M. D., President.

"Biennial Report of the President of Fire and Police Commissioners of the Taxing District (Memphis) of Shelby County, Tennessee," December 1, 1882.

Third and Fourth Annual Reports of the State Board of Health, Lunacy and Charity of Massachusetts. January, 1882, and January, 1883.

"First Annual Report of the Board of Health of Kansas City for the calendar year, 1882."

"First Annual Report of the State Board of Health of the State of New Hampshire." For the fiscal year ending April 30, 1882. Concord, N. H., Irving A. Watson, M. D., Secretary.

PERIODICALS RECEIVED.

"The Popular Science Monthly," April, 1883; "The Modern Age," April, 1883; "The Continent," March, weekly numbers; "Engineering News," March numbers; "The Proccdings of the Medical Society of the County of Kings," Brooklyn, N. Y.; "Science," March numbers; "The Inland Architect and Builder," Vol. 1, No. 1. Chicago, February 1, 1883.

NOTES AND NEWS.

GAS FOR NOTHING.

A gentleman at Chester claims to know a peculiar description of oven for making coke which, without the help of a high chimney, enables those who use it to drive steam engines without any expense for fuel. Every ton of coal consumed in the oven yields coke worth 7s, and tar and ammonia worth 4s, in addition to 14,000 feet of gas. If, therefore, the first two products are sold, the price—11s—more than pays for the slack coal from which they were derived, as well as for labor, wear and tear, and interest on the capital sunk in plant. The manufacturer consequently gets 14,000 feet of gas for nothing from every ton of coal subjected to the process, and this he can use instead of fuel to generate steam.—*The Glasgow Mail.*

THE ELECTRIC LIGHT.

A new difficulty lately presented itself in the use of the electric light in a manufactory where a large number of emery wheels were used, "The rapid travel of the armature of the generator created a suction in the air, and this, added to the magnetism of the field magnets, naturally drew all iron-filings floating in the air toward and into the machine. These small particles, attaching themselves to the armature strips, were brought in contact with the electric sparks of the machine and heated sufficiently to burn out the sections of the armature. The loss of section, of course, breaks the circuit and puts an end to further operation. Several sections were burned out and the folly of persisting demonstrated."

Fruit may be ripened by the electric light, but it is said that it is unpalatable. Strawberries grown in this way last year, under the direction of Professor Siemens, were worthless. Some melons ripened were of such poor quality that to render them eatable they would need to be strongly flavored with condiments.

The City Council of Elgin, Ill., has decided to substitute electricity for gas for lighting the city. The Brush light and tower system will be used, at an agreed cost of $6,500 a year. There will be six towers. The present cost of lighting by gas and gasoline is between $6,000 and $7,000.

The electric light has been introduced into the factories at Mobile, Ala.

MISCELLANEOUS.

It is stated that the waste which passes through house drains does not act injuriously on iron. In the manufacturing districts of Lancashire and Yorkshire, according to *The Journal of the Society of Arts*, sewage is extensively used for steam-boiler purposes, the boilers having special arrangements for blowing out mud. Sewage does not fur the boilers, and is consequently preferred to clean but hard water. Sewage contains solutions of soap, oil and fatty matters which tend to protect iron. Cast-iron pipes, it is claimed in the same journal, may be jointed with Portland cement in place of lead, making the strongest joint known. At Chatsworth, the cast-iron pipes for the Emperor Fountain are jointed with Portland cement.

It is related that a lady at Parkville, Connecticut, when one of her children was taken with the prevalent fever, which tends to blend with diphtheria, and has proved so fatal, resolved to adopt preventive measures, to save at least the other children. She hung up sheets in the sick room that were thoroughly wet with carbolic spray; and pretty much everything else in that and adjoining rooms was similarly treated. As fast as the wetted articles became dry, the carbolic acid was renewed. The result was that the sick child rapidly recovered, and neither of the others was taken sick.

By recent decrees it is forbidden (in Paris) to employ boys under 16 years old, or girls under 18 to furnish the power for hand-looms. Boys between 12 and 14 years of age, and girls between 12 and 16, must not be made to draw loads on the highways; but this is allowed on the level floors of manufactories, etc., provided the load and the vehicle together do not weigh more than 100 kilogrammes. Boys only, when over 14 years old, may be employed to haul loads on the highway, provided the load and vehicle do not exceed 100 kilogrammes in weight. Tilers and plumbers are forbidden to employ children on roofs.—*New York Medical Journal.*

The Board of Health of Asbury Park, one of the summer resorts on the New Jersey coast, will hereafter require that every case of infectious disease in the schools be reported to the Board upon blanks furnished the teacher for the purpose. The Board at once forbids the ailing child's attendance at school until an official permit has been given, and also takes full charge of the case, keeping a record of name, residence, disease, date of prescription and of withdrawal of medical attendance. Maps at the office of the Board for public inspection show the location of every case of contagious disease.

A workman who fell into a cesspool at Lyons, France, was taken out five minutes afterward in convulsions. Inhalations of oxygen were administered and transfusion of blood tried, but the man died in twenty-four hours. Since transfusion of blood, which has been performed with success in cases of poisoning by carbonic oxide, which acts on the blood as sulphide of ammonium does, the supposed chief toxic agent in the contents of cesspools, failed in this case, it is suggested that cesspools may contain gaseous poisons more complex and more virulent than sulphide of ammonium.

It is reported that during the prevalence of small-pox in Paterson, N. J., Dr. David Robinson, a physician and preacher, circulated tracts setting forth his views on the subject of contagious diseases. He has now filed a bill amounting to $5,000 against the city for lowering the death-rate of the city by means of his circulars. He charges $1,500 for showing by means of his publications that the ravages of small-pox can be stopped by the use of hot tea.

Unfavorable results from the use of sulphate of quinine in the treatment of typhoid fever in the hospitals of Paris led to an examination of the drug. It was found that the boxes containing it enclosed a layer of genuine sulphate of quinine, but the rest of the contents, hidden under this uppermost layer, consisted of cinchonine, a vegetable alkali derived from quinine, but producing absolutely opposite effects. The quinine was bought of a firm in Milan.

In some recent experiments in one of the work-shops of the Northern Railway in Paris by M. Marcel Deprez, power was transmitted by electricity a distance of thirty-five kilometers, and the proportion lost was only 50 per cent. Three-horse power was transmitted over an ordinary wire four millimeters in diameter.

The Commissioner of Public Works of this city has been instructed by the Council to enforce the law prohibiting the employment of children under fifteen years of age more than eight hours a day.

It cost $20,000 to stamp out an epidemic of typhoid fever at Bangor, England, last year.

Messrs. Thomas Kelly & Bro., of this city, are still adding to their numerous inventions in water-closets and attachments, and are to be commended for their success. Their self-acting flush tanks may be attached to any water-closet, and always work with perfect success. They are now using a National closet, which takes the place of the Brighton, with all the latter's excellencies and some advantages over it. They will be pleased to answer all inquiries by letter or in person to those calling on or addressing them at No. 186 Dearborn street.

BUILDING INTELLIGENCE.

Mr. H. M. Hansen, Architect, has drawn plans for a store and flat at the corner of Desplaines and Indiana streets, four stories high, to cost $11,000; a flat on Wells street near Chicago avenue, to cost $6,500; on Hills street near Wells, to cost $9,000; two flats on Erie street near Elizabeth, for J. Olsen, and a double building at the corner of Ohio and Rucker streets, for P. Samuelson, to cost $10,000.

A permit has been issued to John Quincy Adams to erect a six-story business building at the corner of Wabash avenue and Congress street. Its cost will be $100,000. It will be built of Chicago pressed brick with stone trimmings, and will be practically fire-proof. The architects are Messrs. Treat & Folz.

Six seven-room flats will be erected on Ogden avenue near Randolph street at a cost of $15,000. The architects are Silsbee & Kent, who have also designed a double flat on Oak street near the Lake Shore drive to cost $16,000. The former will be after the modern English Gothic, and the latter Moorish in design.

Architect Quackenboss has planned a four-story business block at Nos. 17 and 19 Dearborn street for Mr. F. C. Porter. It will cost $20,000. He has also planned a residence for A. C. Darborow at No. 222 South Morgan street to cost $6,000.

Five flats will be built at the southeast corner of Van Buren and Laflin streets for H. S. McLain, to cost $30,000, The architect is J. J. Flanders. The upper rooms will have hard-wood finish. The first floor will be occupied for stores.

A building to cost $60,000 has been commenced on Division street, near the Lake Shore drive, to be used as flats. The principal material used will be red pressed brick with Bedford stone trimmings. It will have a frontage of 110 feet. The owner is Mr. William Dickerson.

A block to cost $35,000, of an original Queen Anne design will be erected for L. C. Pardee, J. W. Hobson and J. J. Luther at Nos. 400 to 406 North State street. The roof and gables will be covered with red Akron tile, the first introduced into Chicago.

John S. McKean has prepared plans for a school building at Oakland to cost $25,000. It will be 75x104 feet in size and be built of Indiana pressed brick with stone trimmings.

Mr. J. C. McCullom, of New York, will erect a seven-story block on Market street near Van Buren at an expense of $40,000. It will be of pressed brick with stone trimmings. F. H. Waescher is the architect.

A school-house will be erected at Grand Crossing for District No. 1, in Hyde Park, to cost $26,000. It will be 75x83 feet in size, two stories high, and finished mainly in Georgia pine. M. L. Beers is architect.

BUILDING PERMITS.

CHICAGO.

10 Osborn st, 2-story flats, 20x32, $1,300; O. M. Brady
592 Larrabee st, 2-story flats, 21x50, $3,000; Joseph Koeller
3548 Forest av, 2-story dwelling, 21x42, $3,000; W. H. Yink
622 Wells st, 3-story flats, 24x64, $6,500; H. Eisert
444 Clinton st, 2-story dwelling, 20x40, $3,000; S. Schramck
689 Milwaukee av, 3-story store and flats, 25x90, $7,000; Soninski & Miketynske
579 Taylor st, 2-story store and dwelling, 24x70, $5,000; G. Fritz
Holt av, near Blackhawk st, cottage, 20x50, $1,200; S. Sulka
973 Superior st, 2-story dwelling, 21x54, $2,400; Fred Winkler
2635 Calumet av, 3-story store and flats, 24x70; M. Wheeler
99 and 101 E. Washington st, 2 additional stories, 40x60, $8,000; Sears Building
28 Clarkson st, 2-story dwelling, 23x54, $3,500; H. B. Matthews, Jr.
212 Oak st, 3-story dwelling, 25x60, $7,000; J. B. Lynch
107 Ewing st, 2-story dwelling, 22x40, $2,000; H. Coleman
849 Shober st, 2-story dwelling, 24x35, $1,500; Wm. Schroeder
148 Ada st, cottage, 20x42, $1,200; Isaac Larsen
170 Schiller st, 3-story dwelling, 23x47, $5,000; Carl F. Julin
190 Rumsey st, cottage, 20x48, $1,000; F. Kreplin
130 Ambrose st, 2-story dwelling, 22x60, $4,000; L. Schaf
38 W. Madison st, 1-story additional, 80x64, $6,000; Dennis Ryan & M. Cullen
Evergreen and Hoyne sts, 2-story flats, 21x47, $2,500; Henry Vandyke
751 N. Wells st, 3-story dwelling, 25x50, $6,000; E. B. Sheldon
331 Center av, 3-story dwelling, 25x60, $6,000; Louis Weieh
2929 Shields av, 2-story dwelling, 21x45, $1,500; L. Flaws
261 Rumsey st, cottage, 20x34, $1,000; August Martin
165 to 175 Bissell st, 6 2-story dwellings, 119x36, $15,000; August Lieber
276 Webster av, 2-story dwelling, 21x34, $2,000; Wm. Williams
36 Tell place, 2-story flats, 24x42, $3,000; Benjamin Magne
70 Lincoln av, 2-story dwelling, 22x60, $8,000; Christ Pfeiffer
55 Armour st, cottage, 22x45, $1,000; Joseph Nichols
2847 Dashiel st, cottage, 20x24, $1,000; J. Kuranda
103 and 105 Center av, 3-story flats, 44x48, $8,000; A. Stafford
2538 Calumet av, 2-story addition, 24x21, $3,000; Thomas E. Courtney
244 to 248 Randolph st, 1-story stores, 60x80, $2,000; Conrad Seipp
3144 and 3146 Wabash av, 2-story barn, 30x50, $2,200; A. McIntosh
13 and 15 Park av, 2-story dwelling, 20x43, $7,000; J. J. Shutterly
710 California av, 2-story dwelling, 22x50, $3,000; Mrs. L. Mugler
902 Hinman st, cottage, 20x32, $1,000; H. Schwartz
789 Paulina st, 1-story store, 20x50, $1,200; Frank Novak
542 and 544 Wabash av, additional story, 40x100, $5,000; W. P. Loberg & Co.
564 and 566 Ohio and 7, 8 and 10 Ashley sts, 6 cottages, each 20x30, $2,400; C. J. Hull
641 W. Chicago av, 2-story dwelling, 20x70, $4,000; A. Schnacke
733 N. Wells st, 2-story livery stable, 41x150, $5,000; George Quitman
697 Indiana st, 2-story dwelling, 20x32, $1,500; Mrs. M. Riely
218 Thirty-first st, 2-story store and dwelling, 42x24, $2,500; C. M. Perry
15 and 17 Dearborn st, 4-story store, 31x74, $11,000; F. C. Porter
Fifteenth st, near Western av, cottage, 22x44, $1,000; Mary E. B. Thompson
500 W. Twentieth st, cottage, 20x50, $1,000; Frank Kotrba
352 N. Ashland av, 2-story dwelling, 21x62, $4,000; Ferd Housfeldt
1033 Wilcox st, 2-story dwelling, 22x40, $3,000; Wm. Brown
249 Huron st, 2-story dwelling, 22x36, $2,400; Fred Kleinfeld
573 and 575 Blue Island av, 3-story store and flats, 50x80, $19,000; Springer & Johnson
689 N. Ashland av, cottage, 20x30, $1,000; F. W. Buettner
20 McReynolds st, cottage, 20x42, $1,000; F. W. Buettner.
715 Adams st, 2-story dwelling, 24x60, $8,000; Mrs. H. W. Barrett
76 O'Brien st, 3-story bakery, 23x163, $6,000; D. F. Bremner
583 LaSalle av, 3-story flats, 27x72, $14,000; Mrs. Charles Dagling
48 and 50 Douglas av, 2 2-story dwellings, 44x43, $8,000; O. M. Sheldon
3824 State st, 2-story flats, 25x76, $5,500; J. A. Raabe
2725 Prairie av, 2-story dwelling, 26x68, $9,000; L. W. Pilcher
Congress st, near Western av, cottage, 24x48, $2,000; John C. F. Romies
213 and 215 W. Twelfth st, 3-story store and dwelling, 50x75, $12,000; Frank Rosulek
14 Henche st, cottage, 20x40, $1,000; F. Steinfust
403 Hurlbut st, 2-story dwelling, 24x61, $5,500; Fred Menier
279 Taylor st, cottage, 20x40, $1,000; Charles Petit
356 W. Twelfth st, 2-story flats, 21x58, $4,000; M. Helgel
131 Nineteenth st, 3-story dwelling, 21x50, $4,000; J. Byron
102 Center av, 3-story dwelling, 22x50, $5,500; C. W. Turner
85 Ward st, cottage, 21x34, $1,000; B. Kupke
310 Henry st, 2-story dwelling, 20x50, $3,000; J. Tomm
133 Taylor st, 2-story dwelling, 22x60, $4,000; Ph. Weinheimer
122 to 128 Michigan st, additional story, 80x100, $4,000; Chas. E. Culow
748 Larrabee st, 2-story store and dwelling, 24x60, $4,000; P. O'Connell
439 Dayton st, 2-story dwelling, 24x46, $3,000; S. H. Gammon
823 Washington st, 2-story barn, 30x31, $2,500; Ada S. Havens.
600 to 608 Division st, 4 3-story dwellings, 100x64, $60,000; Wm. Dickenson
250 and 252 Wells st, 2 3-story dwellings, 54x48, $9,000; Philip & Johnson
42 Bellevue place, 3-story dwelling, 17x66, $3,000; Mrs. E. Fontaine
220 N. Sangamon st, 2-story dwelling, 20x32, $1,700; Tony Astrelia
827 Twelfth st, 3-story flate, 21x60, $5.000; Rudolph Bielfeld
Dashiel st, bet. 30th and 31st sts, 5 cottages, 100x36, $5,000; Ch. Farr
765 N. Wood st, cottage, 21x52, $1,500; F. Kruming
218 N. Sangamon st, 2-story flats, 18x48, $3,000; R. Dannfreo
Kendall st, near Polk, cottage, 20x40. $1,400; W. H. Bush
101 and 103 Clark st, 2 additional stories, 36x80, $15,000; W. H. Dillingham
715 Indiana st, 2-story store and dwelling, 22x55, $3,500; John Cramer
109 LaSalle av, 3-story dwelling, 25x70, $10,000; G. Merz
507 to 511 Twenty-first st, sash and door factory, 40x50, $2,000; Machek & Kasper
369 S. Morgan st, 2-story flats, 22x54, $4,500; Wm. Tricks
850 and 852 S. Ashland av, barn, 48x21, $1,200; Josef Cedik
Plum st, near Loomis, 2-story dwelling, 21x44, $3,000; Mrs. M. Smith
84 Wilson st, 2-story dwelling, 21x54, $3,500; Josef Hlavacek
Owasso st, near Western av, cottage, 20x30, $1,000; G. D. Pease
408 S. Wood st, 2-story flats, 22x55, $7,000; Grace L. Max
989 Nineteenth st, 2-story dwelling, 23x50, $3,200; Matt. Lestina
39 Ashley st, 2-story dwelling, 24x38, $1,000; C. J. Hull

DAYTON, OHIO.

West Third st, near Summit, 2-story frame, S. N. Smith
LaBelle st, bet. McLain and Richard sts, Frederick Hoehn
Germantown st, near Washington, 2-story frame, Sophia Tesno
Franklin st, bet. Ludlow and Prairie, 2-story frame, Fred Klenyert
Henry st, bet. Richard and Xenia ave, 2-story frame, Robert Hogan
Main st, cor. of Babbitt, 2-story frame, E. P. Hiller
Montgomery st, bet. Fifth and Barr, 2-story brick, John W. Eichelberger
Washington st, 2-story frame, John B. Stewart
Main st, bet. Vine and Union sts, 2-story brick, Patrick Terry
First st, bet. Broadway and railroad, 2-story frame, Robert Hudson
East First st, bet Terry and June, 2-story frame, John F. Gerber
Jefferson st, bet. Green and Jones, 2-story brick, Simon Wagoner
Central av, near River, 2-story brick, George Snowden
Main st, bet. Second and Third, 5-story brick, W. P. Callahan
East Third st, bet. Madison and the Canal, 3-story brick, J. H. Balsley
Keowee st, bet. Valley st and the railroad, 2-story frame, Gregory Kessling
Valley st. 2-story frame, W. P. James and A. C. Brandway
Harker st, near Troy, 2-story frame, David P. Turner
Eagle st, bet. Fifth and McLain sts, 2-story frame, John Ciegler
Hopeland st, near Albany, 2-story frame, Sarah A Hoge
Cemetery st, near Brown, 2-story frame, Joseph Wilferth
Junction of Miami and Eagle sts, 2-story frame, Hiram Williams
West of VanLear st, bet. Third and Springfield, 2-story brick, Henry Knoof
Perry st, bet. Fourth and Sycamore sts, J. H. Kiefer
Perry st, bet. Fourth and Sycamore sts, 2-story brick, J. E. Reed
McLain st, near Howard, 2-story frame, John Wheeler
Fifth st, near Linden av, 2-story frame, Jasper E. Artz
Mead st, 2-story frame, Kuntz and Johnson
Mead st, 4-story frame, Kuntz and Johnson
Wyoming st, cor. of Brown, 2-story brick, Catherine Ritzler
Water and Dale av, 2-story frame, James Manning
Hawker st, cor. of Pierce, 2-story brick, Christian Poock

THE SANITARY NEWS.

VOL. I. APRIL 15, 1883. NO. 12.

CURRENT TOPICS.

A PLAN has been fixed upon for furnishing the village of South Evanston with water, which is not so common in this country as not to be novel. It is that of using an infiltration-basin from which the water will be pumped in the usual way into tanks and thence distributed through underground pipes throughout the village. This basin will be along the lake shore, which, at that point, is simply a beach of clean sand, and about one hundred feet from the water line. It will be about one hundred and forty by fifty feet in size, and the bottom of it nine feet below the surface of the water in the lake. It is calculated that it will hold six hundred thousand gallons, enough, if filled daily, to supply a population of six thousand, including lawn and garden sprinkling, etc. A tank to hold sixty thousand gallons will be constructed, into which the water will be pumped by engines, to be distributed then by force of gravity. It was owing to the expense attending the laying of pipes a long distance into the lake, or digging tunnels, that water was not taken from the lake in the usual way. It is expected that water will filter through the clean sand into the basin and thus be made fit for potable uses, while it would not be if taken from the lake itself near the shore. Infiltration-basins are said to be in successful operation at Hamilton, Ontario, at Toronto, and at Indianapolis, on a somewhat limited scale. The plans for the system at South Evanston were prepared by City Engineer Artingstall. That suburb has, also, a system of sewerage in process of construction, discharging into the lake. Already six thousand feet of sewers have been laid.

AT the last meeting of the Chicago Master Plumbers' Association a paper was read by Mr. J. J. Wade—published in another column of THE SANITARY NEWS—which ought to be read and appreciated by every plumber. He speaks in plain terms, but because he is a plumber himself and understands what he says, his words will have weight. Very much of the unjust treatment given plumbers is due to the total depravity and ignorance of a few of their number. These have not hesitated to do bad, and even criminal, work, even when they knew anything about their business. It was nat-

ural that the odium belonging to a few should attach itself to all the craft, especially since the people who accepted their work were too ignorant of sanitary plumbing to discriminate between that which was good and that which was bad. Again, there has not been until recently a unanimity of feeling or action between the plumbers, and the best of them have been trying in a quiet way to "cut one another's throats" in business. This apparent hostility the public has seen, and has shared in the distrust, but extended it further than to individuals and included all plumbers. "If," as one of them said a short time ago, "we really found such fundamental errors in the plumbing of a house that the remedying of the one or two defects complained of would do no good, and we stated plainly that the work was wrong in principle and ought to be replaced, we were simply set down as plunderers and in league at that to beat the unlearned and suffering house-holder. All of us have shared the blame which belonged to a few who did not know how to do good work, or were unscrupulous." It is claimed that the fault of bad plumbing must be charged largely to the authorities at the City Hall, who grant licenses to men to do plumbing who have had little experience, no teaching and scarcely any intelligence. It may not be literally true now, but in the past a man who could carry a carpet sack under his arm, containing a chisel and a piece of lead; who had money enough to rent a week in advance an unused basement for a shop, but who could secure a "recommendation" from a fifty-cent alderman, who was quite likely to have no more intelligence and less honesty than his portegé, such an applicant would have no trouble in securing a license to do plumbing. Some effort is now made, apparently, to determine the capability of an applicant for a license, but it really amounts to but very little, as an alderman's backing counts for more than years of training.

The possible abuses of an apprentice law may operate against its enactment, but it is certainly true that there should be some means of compelling men to learn the business of plumbing before they engage in it. As Mr. Wade says, something more is required now than mere mechanical skill. Plumbing is a profession as well as a trade; hence, the young man, or boy, who concludes to become a plumber should be taught more than he can learn in the shops, and in the use of tools. An industrial school is needed, but for none more than plumbers; and then when the plumber has received his education, practical as well as theoretical, he should not be allowed, under penalty of the law, to do work in any house until he had passed a careful examination under competent authorities either at an established and legally authorized school, as physicians are, or by a responsible commission. A city employé, whether at the head of a department or not, has no more right, morally, to grant a plumber a license because some politician says "he is all right," than to give a person authority to practice medicine. The plumbers are themselves on the right road now to securing the respect and confidence which has so long been denied them. They know best how the abuses which have hurt them can be corrected, and when they move in the matter they should receive earnest encouragement. The Association is now well organized, in earnest, harmonious and determined to wage a warfare of extermination against disreputable and persistently-ignorant plumbers. The public has a good deal of interest in this matter.

A sanitary convention will be held at Reed City, Michgan, April 26 and 27, under the auspices of the State Board of Health. The objects of the convention are the presentation of facts, the comparison of views, and the discussion of methods relating to the prevention of sickness. Among the subjects to be discussed are the following: "How Diseases are Contracted and Communicated," "The Contagiousness of Diphtheria," "Personal Liberty vs. Public Health Laws," "Co-operation of Citizens with Sanitarians a Necessity in Preventing the Spread of Disease," "The Ventilation of Ordinary Dwellings," "Food and Its Adulterations," "The Disposal of Slop-water and Waste Matter in Villages," "Drainage and Sewerage," and "The Water Supply of Reed City and the Dangers of Its Contamination." The convention ought to receive the most earnest encouragement, and be largely attended, not alone by the people of Reed City but throughout the State.

During the past year fines amounting to $2,045 were imposed in the police court, and $5 in the criminal court for violations of the smoke ordinance in Chicago. Dr. Paton, who was in charge of the work of suppressing the nuisance, says in his annual report to Commissioner DeWolf that citizens, as a rule, showed a very commendable desire to have the smoke nuisance abated, and that a very considerable amount of work was done in that direction. For the prevention of smoke the Inspector states his preference for the coking process,—pushing toward the rear of the fire-bars the already live coals and placing the green coals in front, so that the gases arising from them in coking may be condensed in passing over the incandescent coal. As to the numerous devices, he considers the sloping bars preferable—sloping either toward the front or rear, or laterally upward or downward. An important consideration is the boiler-setting, by which a very large space may be provided for the perfect intermingling of the gases of the coal and the atmosphere.

La Crosse, a city of twelve or fifteen thousand inhabitants, is to have a system of sewerage; at least, it has had plans prepared by Benezette Williams, of this city, and is expected soon to decide upon carrying them out. The plans provide for discharging the sewage into the Mississippi river by one main sewer near the middle portion of the town. Two intercepting sewers receive the contents of other mains and, extending along the river, one north and the other south, empty into the principal main. It was found to be impracticable to discharge the sewage into the river at more than one point because of the water-works to the north and a shallow channel, or bayou, along the river bank to the south. The system is partly combined, and partly separate,—that is, none of the storm water will be admitted to the sewers except that which falls on the roofs of buildings. Street water will run off in the gutters, except that provision has been made to drain one or two low places by the sewers. The sewers will be thoroughly ventilated by perforated manhole covers.

In his last annual report Mayor Harrison said, in reference to the work of the Health Department of this city during the past year: There have been 13,564 nuisances ex-

amined, reports made upon them and abated. There have also been 994 sewer connections ordered and made, 6,421 privy-vaults cleaned, 13,733 dead animals removed from the streets, and 403,440 pounds of various meats unfit for food and found in our markets have been condemned and sent to the rendering-tanks. The tenement-house and workshop inspection and the supervision of business in process of erection have been energetically and successfully pursued by the department. Almost a new industry of gigantic proportions has been undertaken by some of the larger houses engaged in slaughtering at the Stock-Yards—to-wit: the delivery of fresh beef in the carcass to Eastern consumers. If the animals supplying the fresh meats consumed not only in the larger cities, but in the villages of the New England and Middle States, are to be slaughtered within the limits of our sanitary supervision—as is contemplated—we are to become the rendering-site of America, for the blood, offal, scraps, horns feet, and hides must be cared for here. This intention has so far developed as to largely increase the labors of the Health Department in the Stock-Yards district. Thus far it has been able to prevent any great nuisance as the result of these extended operations.

The Governor of Louisiana has issued a proclamation establishing quarantine against vessels, crews, passengers and cargoes from Matamoras, Tampico, Tuxpan and Vera Cruz, and Minatitian; all ports on the Island of Cuba, Hayti, San Domingo, Porto Rico, Jamaica; the Brazilian ports of Rio de Janeira, Bahaia, and Pernambuco; other West India Islands and ports along the Isthmus and the coast of South America as far south as Brazil; the Islands of Barbadoes, St. Thomas, Martinique, Guadaloupe, and Trinidad, and the ports of Colon, Cartagenia, Lavanilla, Baranquilla, Laguayra, Georgetown and Cayenne. The quarantine is to go into effect May 1. It is unusually severe, and amounts practically to non-intercourse with the specified points.

The department of Public Works of this city is having some difficulty in keeping the work of plumbing and drain-layer within legalized bounds. It has been recently occupied in sending out a circular letter addressed to licensed plumbers, in which attention is called to Article 57 of the Municipal Code, relating to sewers and drains, and closing as follows: "Any violation of the above ordinance by a licensed plumber or other person will be cause for the prompt revocation of his license and the enforcement of the penalties prescribed by law as above." The section of the law referred to and quoted is this: "Any person who shall lay, alter or disturb any part of a house drain or drains; catch-basin or strainer of said drain or drains; cesspool or water-closet, connected with any brick or pipe sewer belonging to said city, without being duly licensed to perform the same by said commissioner, shall be subject to a fine of not less than $10 and not exceeding $50 for each offense, which shall be recoverable against the person or persons performing the work or their employers."

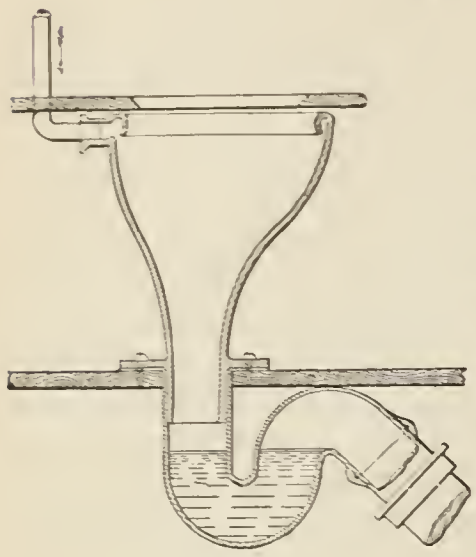
At the meeting of the Sanitary Council of the Mississippi Valley at Jackson, Mississippi last week, a series of resolutions was adopted in which the confidence of the States of the Valley in the National Board of Health was expressed. A committee was appointed to petition the President of the United States to place $100,000 of the epidemic funds in the hands of the National Board of Health for disbursement in case its use is demanded. It was also decided: (1) That in case the National Board of Health is deprived of the power of making inspections of persons and freight, when demanded by local doctors, the health certificates issued under the supervision of the representatives of the Sanitary Council of the Mississippi Valley shall be accepted as valid by the Boards of Health of the Mississippi Valley, provided such inspection shall be carried on under the rules and resolutions heretofore prescribed by the National Board of Health. (2) That the Sanitary Council recommend that the States of the Valley make voluntary contributions to be expended under the Executive Commission of the Council to continue river and rail inspection in the event that the funds are placed in the hands of the National Board of Health for this purpose. (3) That the Sanitary Council recommends for the guidance of health organizations of this valley the system of inspection, isolation, disinfection, and quarantine heretofore adopted by the National Board of Health.

Building operations in this city received a sudden check last week by a strike of the bricklayers. The demand of the latter for an increase in wages seems to have been for the benefit, principally, of an inferior class of workmen who, the Union insisted, should suffer nothing from inexperience. The employers claim to have been willing to pay capable men all that they have asked, but objected to placing a new man, who had no claim to the title of bricklayer, except his membership in the Union, on a wall by the side of a man old in the business with the same pay. It is said to be not uncommon, after initiating a member into the Union, even when he is unable to lay bricks to a line, or spread mortar evenly, to set him at work on outside walls, under the eye of an older member, where he virtually learns his trade. As the Union controls the movements of its members the employer is helpless. Asking that the "green" hand shall receive the same wages has met with a firm refusal. It is not likely that operations will be suspended long, as steps have been taken to secure non-union workmen, and to protect them in their work.

In commenting on the new method of drainage which has been in operation for some months in one of the suburbs of Paris, an account of which recently appeared in The Sanitary News, *The Chicago Tribune* says: "Paris is popularly supposed to be the most perfectly drained and sewered city in the world, but it is really very defective. A large part of its refuse goes into cesspools, and the sewers and the water-supply are both inadequate, it is stated, to permit it to be turned directly as with us, into the sewers. This problem is hurrying to place its perplexities before the people of Chicago. The lower classes that we really have the most to fear are the bacteria who are populating our sewers with a more than Malthusian fecundity. All that Chicago does with its sewage is to put it out of sight. We do not get rid of it. We may be sure it will return to plague us some day."

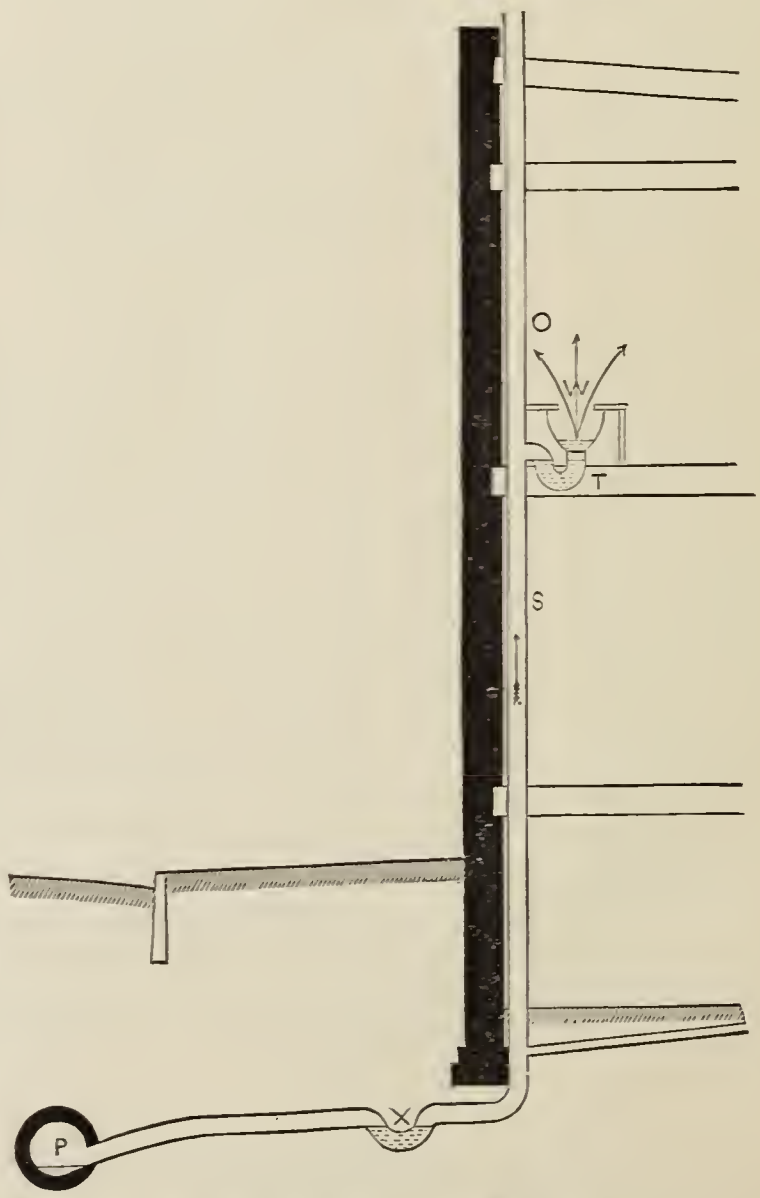
HOUSE DRAINAGE AS IT IS.

VI.



LONG HOPPER CLOSET

It is only a few years since the soil-pipe, at its upper end, terminated invariably at the highest water-closet with which it was connected. This was well enough so far as conveying away the contents of the closet was concerned; but this was supposed to be all that was required of house drainage. It is only in houses that have been built recently,—and, unfortunately, only a very few of them—that this primitive idea has been departed from. To get sewage out of sight has been all that the plumber and drain-layer were required to do. Among the first imperfections in house drainage to be discovered were defective joints in the house underground drains, due to careless workmanship or the uneveu settling of the drain sections, and the liability of the drains being crushed by the settling of the walls of a building, through which they must pass. These defects in construction, or design, permitted the escape of liquid waste into the earth until it became saturated with sewage. Such a nuisance ought soon to reveal itself and be removed. But, however well the drains might be constructed, the foul gases of the sewer, or the still more pestilential ones generated in the drains themselves, found their way into the house. The running trap, shown in a previous illustration, as well as in the one given below,—at the letter X,—was first put in and served to check the foul air. Yet, a little pressure of the sewer gases would readily displace the water in this trap and find access to the soil-pipe: or, the water rushing through the drain when discharged from the water-closet would cause such displacement of the water in this trap as to admit of the passage of the sewer air. The same forces at work on the water in the S trap under the water-closet would open a direct communication with the rooms themselves. At length the idea was conceived of extending the soil-pipe to and above the roof, as shown in the accompanying illustration,—S indicating the soil-pipe proper, and O the portion extended. At first thought this would seem to be a positive relief to the hitherto pent-up gases; but the action is only a negative one, just as lowering the window of a room from the top does not really ventilate the room. The chances are,—rather, it is a fact,—that the foul air of a sleeping-room will pass through a door into an adjoining room before it will climb up, voluntarily, over the sash of an outer window into the open air. So is it precisely with the foul air, or poisonous gases, in a soil-pipe which is "ventilated" only by an open extension upward. If gas accumulates below the water of a trap it will certainly find its way through that trap, either by absorption on one side and giving it off on the other, or the water will be displaced by the sudden discharge of a large flush, by siphonage, or otherwise, sufficiently to allow the gas to pass it. This is indicated by the arrows in the illustration. This is a more serious matter than might at first be supposed. A soil-pipe, ordinarily constructed of cast-iron, rough on the inside as well as without, with cavities at the imperfectly-made joints, very soon becomes coated with the solid parts of sewage. This is exceedingly foul at first, but increases in its foulness as it remains in place and receives accretions, until the soil-pipe becomes like the privy-vault itself, or a noisome cesspool. Any one knows that either of the latter is not merely an offense to the smell; it is positively dangerous. Children may fall into a well and be recovered but little the worse for the soaking, but never from a privy-vault or cesspool. Only a recent number of THE SANITARY NEWS contained an item relative to a misfortune which befell a workman, who, having fallen into a vault and being quickly recovered, lost his life in spite of the transfusion of blood and all other known means of restoration, after the inhalation of poisonous gases. These vaults and cesspools are open to the air above, but they are not ventilated. So it is with the soil-pipe which has been extended to and above the roof, but which has no opening to the outer air at or near its lower end. The gases of the soil-pipe do not simply settle to the bottom and remain there, pent up and harmless, as in the case of the vault and cesspool, except to those who enter them, but are continually stirred up by the water discharged into the soil-pipe, or subjected to heavy pressure. They are thus forced through any defective joints, or holes, with absolute certainty. While it is intended hereafter to show in detail what should be done with house drainage to secure immun-

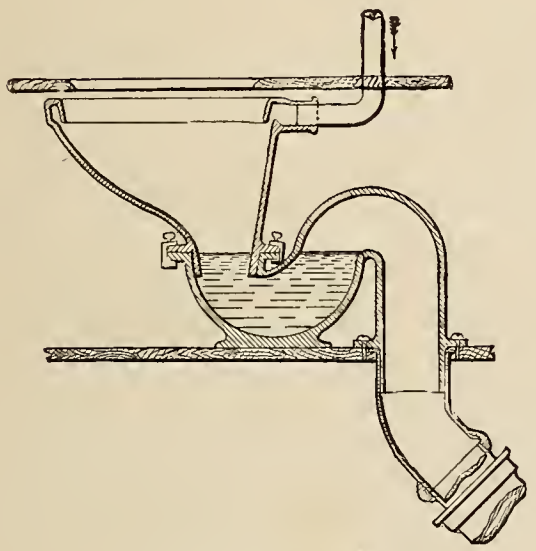


SOIL-PIPE IMPERFECTLY VENTILATED.

ity from all these dangers, it may be stated here that in addition to extending the soil-pipe to and above the roof an inlet pipe should be led up from the main drain, inside the running trap X, to the surface of the ground. An absolute ventilation of the soil-pipe and drain is then established. The greater height of the soil-pipe, and the higher temperature of the building within the walls of which it is located, tend to create an upward movement of the air in it. Before, there could be no circulation, as an escape of air from the open end of the pipe would create a vacuum, something which natural forces never do; now, the displaced and foul air is at once replaced by that which is fresh and pure from the outside. It is well, then, for the house-holder and the house-renter to inquire further than for unbroken drains, perfect joints, good connections and soil-pipes opening above the roof—the fresh-air inlet must not be forgotten.

CHICAGO SEWERAGE—ITS INCEPTION.

I.



SHORT HOPPER CLOSET.

Of equal importance with house drainage is the sewerage of a city or town. The nuisance and the danger attending the disposal of house waste do not end with getting it safely into the sewer. Just as it becomes absolutely necessary in the life of every city, sooner or later, to devise some means of removing liquid and solid refuse, whether of the person or the kitchen, entirely from the premises, so it must be taken from the streets and from the city. Before drains and sewers came into use filth of all kinds was removed by carts and other conveyances to the country, or to some body, or stream, of water. Either the occupants themselves did this, or the refuse was thrown into the streets for the public authorities to cart away. This was not always done promptly and the result was the plagues which ravaged so many cities in the Middle Ages, and even later. It is now almost a universal practice to discharge sewage into the nearest flowing stream, just as Chicago does into its river. In Chicago this is looked upon as little more than an offense to the senses; in time, if persisted in, it will have a most serious effect upon the health of the people, not only of the city itself but of the country through which the sewage flows. That the disposal of sewage is thus a very serious matter has been recognized in England, where by statute the sanitary authorities of any municipality are not permitted to discharge raw sewage into running streams. This law is violated, so far as London is concerned, but the penalty is being paid in increased death-rates and discomfort, and the question of otherwise disposing of the sewage of the metropolis is being seriously considered.

The influence of a system of sewerage on the health of a city is clearly shown in the experience of Chicago. According to the annual report of Dr. John H. Rauch, Sanitary Superintendent, in 1873, for the six years commencing in 1849 and ending in 1854, the death-rate was 48.92 in a thousand; while for the six years commencing in 1856 with the construction of the sewers, and ending in 1861, the death-rate was only 22.97, with a marked prevalence of scarlet fever during four of these years. For the next five years the construction of the sewers did not keep pace with the increase in population, and the death-rate increased to 25.77. "For the first period of sewer construction, ending in 1860, there were built 2.59 feet to one of the population; for the next, ending in 1866, there was a falling off to 2.23 feet, and from 1866 to 1870 inclusive there was an increase to 2.67 feet, and in 1871 a decrease to 2.54, and in 1872 a still greater decrease to 2.43 feet. It will, therefore, be seen," continues the Doctor in his report, "that for the last two years the population of the city has been increasing faster than the sewerage has been extended, and that this is the chief cause of the increase in the death-rate. Allowing 1,200 of the deaths for increase of population and the direct result of the Fire, we still have an increase of 900, who, I am satisfied, died from the want of proper drainage."

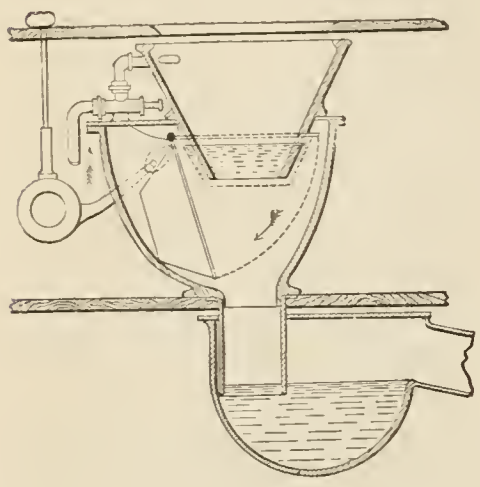
Previous to the year 1854 Chicago was drained only by submerged wooden boxes on a few of the principal streets. These were built, primarily, not for drainage purposes but to furnish a water supply from the river in case of fire. They were found to be serviceable in carrying off surface water from the streets, and in time came to be used, to a limited extent, for house drainage. But, as these box drains were laid without system, and limited in number and capacity, they were really of little use as drains. The streets are said to have been almost impassable in wet seasons of the year, and "the lots were frequently half filled with abandoned privy-vaults, it being easier to fill them up than to have them cleaned." The city was scourged in consequence by epidemics for six years in succession—five of cholera and one of dysentery. The death-rate became the highest of any city in the United States, in 1854 reaching nearly 5½ per cent. of the population, cholera raging in that year. Notwithstanding the city had reached a population of nearly 75,000 it was not thought necessary to provide any system of sewerage; but the repeated epidemics compelled consideration of the question as a matter of self-defense. A Bill was presented to the Legislature, which was passed and approved on February 4, 1855, creating a Board of Sewerage Commissioners, to be appointed by the City Council. The first Board consisted of William B. Ogden, J. D. Webster and Sylvester Lind, one from each Division of the city. Mr. E. S. Chesbrough was appointed Chief Engineer. The remainder of the year was spent in making surveys and preparing plans, which were adopted in December; work was begun on the sewers early in the following year, the spring of 1856.

A summary of a few of the sections of the Act establishing the Commission will give an idea of the work undertaken by it. It was provided, as follows: (1) It shall be the duty of the Commissioners to examine and consider all matters relative to the thorough, systematic and effectual drainage of the city of Chicago, not only of surface water and filth, but also of the soil to a sufficient depth to secure dryness in cellars and an entire freedom from stagnant water, and in such manner as best to promote the healthfulness of the city. (2) It shall be the duty of the Commissioners, before enter-

ing upon the construction of any sewer, to fix upon a plan or system of sewerage of such a nature that all subsequent sewers may be executed upon that plan. (3) It shall be the duty of the Board to prescribe the location, arrangement, form, material and construction of every private drain or sewer emptying into the public drains or sewers, and to determine the manner and plan of such connection. (4) It shall be the duty of the Board to see that proper drains or sewers are constructed from every lot in the city which, in their judgment, requires it, and that such private drains or sewers are made to communicate with the public drains or sewers in a proper manner, and they shall have power to require such number of drains or sewers to be thus constructed as they shall deem expedient.

THE RELATIONS OF SOIL-WATER TO HEALTH.

I.



PAN CLOSET.

The present age is characterized by a thorough and exhaustive examination of the relation of physical causes to health and life. This does not stop with speculation and philosophizing, but every alleged cause is subjected to a rigid cross-examination of test-tube and crucible, the balance and the spectroscope; and every witness is summarily sent out of court that will not endure every test of physical science. Sanitary science has passed its infancy of belief in authority, and has attained that state of development where it demands causes as well as results, and has planted its feet upon the solid platform of positive physical science. The capital crime of physical existence is filth. Continuance in life is made possible only by continuous purification. The prime necessities of life are the two great natural purifiers, air and water. The first and last act of life is to breathe, and all the intervening moments which make up earthly existence are only so many pearls strung on a thread of air; if the thread breaks life is gone. Less obviously, but no less certainly, is water of vital importance; from birth to burial it is an absolute daily necessity. Indeed, air itself could have no vital action in the entire absence of water. The ocean of air sweeps around us in surges of enormous size, which we call winds, and is too vast for human defilement in mass; we can only pollute it in spots, and for this purpose we must fence it in with impermeable walls. But we deal with water in detail, and in the small amounts with which we have to do in ordinary life it is easily capable of defilement. The special office of water is to purify, but in purifying it becomes itself impure. In the words of Prof. Corfield, "Water comes to the community to be soiled. It comes to wash communities, places and habitations. It comes, I repeat, to be soiled. It is therefore, generally, when soiled, useless for the purpose it was originally wanted for. It has either to be purified or got rid of." But in order that water may be a purifier it must itself be pure. If it is charged with filth, visible or invisible, loaded with disease germs, or capable of acting as a nidus for their development, it becomes a source of danger, all the more destructive because unsuspected. The minister of health is thus transformed into an insidious destroyer.

By soil-water I mean water which has been freely in contact with the soil by falling upon its surface and freely percolating or filtering through it, and thus enabled to take up a certain amount of soluble materials from the soil. Lake and river water has at some time been thus exposed to soil action, but the peculiar influences exerted upon such water by free exposure to oxidizing influence of air, aided by motion of currents and waves, and the tendency to precipitate a portion of the materials held in solution by mixture and agitation, have such an influence upon fluivatile waters as to place them in a class separate from soil waters, which exist in, or are drawn from, the earth. In the discussion, I restrict the term soil-water to water from wells and from springs. Such water has been in most intimate connection with the soil, and its constitution will be affected by the nature and amount of soluble materials it has found in the soil, and by the action of the soil itself upon the materials contained in the soil, both those held in suspension and those in solution. I class well and spring water together as being essentially alike; the chief point of difference is that the spring flows with a certain volume all the while, but the well parts with its water only occasionally. We may say the spring pumps itself all the while, but the well is pumped only at intervals. If the soil from which the spring flows has only a limited amount of polluting material, the volume of water flowing from the spring may entirely remove such foul material or reduce its amount below the danger line; whereas, the same amount of such offensive material might dangerously contaminate the water of the intermittently-used well. The quality of the water has a large influence in nullifying the influence of filth free from specific poison. How great must be the amount of dilution to destroy the specific poison of cholera or typhoid, I have no means of determining, but the dangers from non-specific poisons is certainly greatly diminished by dilution.

Water may exist in the soil in three forms: (1.) Hygroscopic water, which exists even in the dryest soils; the "summer's dust" still holds water, which may be made evident by placing a quantity in a dry test-tube and applying heat, when drops of water will gather upon the cold sides of the tube. (2.) Capillary water, which renders the soil moist and darkens its color, but which will not flow out of the soil by action of gravity. (3.) Free water, which will flow by gravity to a lower level and constitutes the water in drains, springs and wells. It is mainly with free water that the sanitarian has to deal.

The popular impression in regard to tne source of water in a well, namely, that it comes from "a vein of water," or subterranean rivulet, and has no connection with surface water, is misleading. Such a condition is possible but improbable. Even if the chief supply of water to the well is from some porous stratum or vein, yet an open well will receive the drainage from the surrounding porous soil. The free water in the soil surrounding the well will tend to flow into such well with a pressure proportional to the depth of the well, diminished by the frictional resistance of the soil

on the flowing water. The area drained by the well may be represented as an inverted cone. (See Figure 1—"Cone of Filtration.") The apex of the cone touches the surface

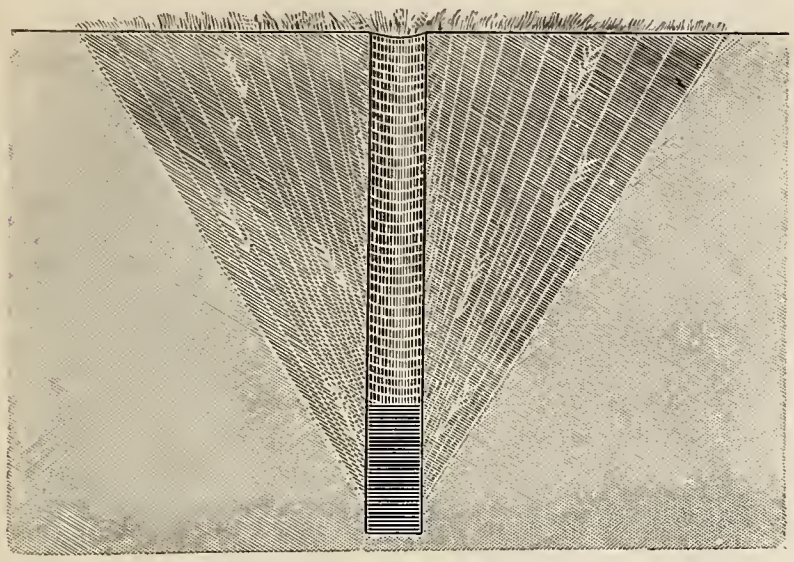


FIG. 1.—CONE OF FILTRATION.

of the water in the well and the base of the cone is at the surface of the soil. The diameter of this base or the circle of surface soil drained by the well, will vary with the porosity of the soil. If the soil is a tenacious clay, the diameter of the circle, or base of the cone, may not exceed thirty or forty feet, but if the soil is porous sand or gravel it may be sixty to two hundred feet, according to the depth of the well. Any soluble material within this cone of filtration will naturally find its way into the water of the well. This calculation is made on the supposition that the soil is uniform in texture, but if strata of unequal permeability, or if seams and water paths exist in impervious clays, we may find a wide departure from the limits given. Any one will perceive an essential difference in the conditions when water flows in a stream through a passage in the soil, or filters particle by particle between the atoms of the soil. It is safe to bear in mind that all soluble materials within the cone of filtration may find their way into the water of the well, while materials without the ordinary cone of filtration may yet find their way into the well if water-paths exist in the subsoil. On the other hand, if we have any source of pollution in the upper soil, the contaminating influence, as carried by free water, will extend both downward and laterally according to the porosity of the soil. The area of pollution from a vault or cesspool is a cone with its apex at the surface of filth; the perimeter of the cone and its vertical depth will depend largely upon the permeability of the soil. A glance at the vertical section of the "cone of pollution" (Figure 2) will make this evident. Place the cones of filtration and of pollution in near neighborhood to each other and see how instinctively they stretch out their hands toward each other, and how naturally their fingers intertwine in the cool waters of the well! Will the "moss-covered bucket," though "dripping with coolness" bring safety and health from such a source?

This gives an appalling picture of the possibilities of most of our wells. But there are certain conservative agencies which serve to tone down the startling outlines of this picture. The soil itself is not a passive agent, but exerts a marked influence upon substances presented to it by the action of water. Soil may act upon such substances in three ways: (1.) As a mechanical filter to separate substances held in suspension in water. This liquid contains Prussian blue so finely divided that it will take hours for it to settle and leave the water clear, and it will pass through the pores of the finest filter paper; but filtered through this thin layer of soil, it is all arrested and the water comes through colorless. (2.) The soil may act as a mordant to fix and remove coloring materials from solution in water. Browner, of Baden, in 1836 first noticed that when a strong and offensive solution of dung-water was filtered through soil, the color, odor and nearly all the taste were removed by such filtration. This dark-colored and offensive water, the drippings of the barnyard, when filtered through this layer of soil, comes through devoid of color and smell. For this reason, nearly all subterranean waters are clear and bright, although nearly all surface waters are colored. A well in a barnyard may hold clear water. (3.) Soils may produce chemical decompositions of materials presented to it in solution and fixing them in insoluble form in the soil. This is a fact of the highest importance in a sanitary point of view. This dilute solution of chloride of ammonium when filtered through the soil gives up almost the entire amount of the salts to the soil. A great variety of salts are thus fixed in the soil in insoluble form. The soil is thus a purifier of the water which flows through it. But this power is limited. The soil is a sanitary filter, removing offensive-smelling and bad-looking materials from solution in water, and fixing these in insoluble form, even reversing the usual laws of chemical affinity, but the power of a given amount of soil is limited, and when this limit is reached, such soil, for the time, ceases to be a sanitary filter and all its powers of protection are for the time exhausted. The greater the amount of soil for filtering a given amount of contaminated water, the longer the time before exhaustion of this sanitary filter.

Hence the value of deep wells, provided the water filters through the entire depth of soil, and does not trickle down the open sides of the well; hence the value of "drive wells," in which the water is compelled to filter through the soil, excluding mere surface filtration, besides the security

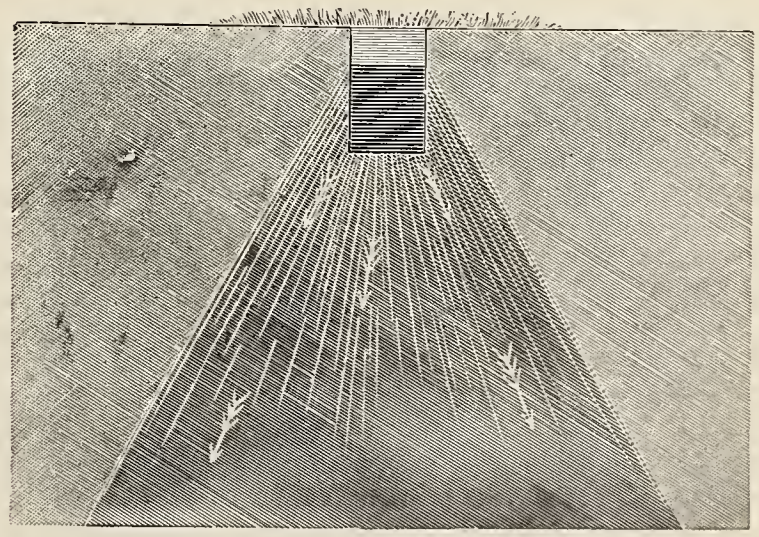


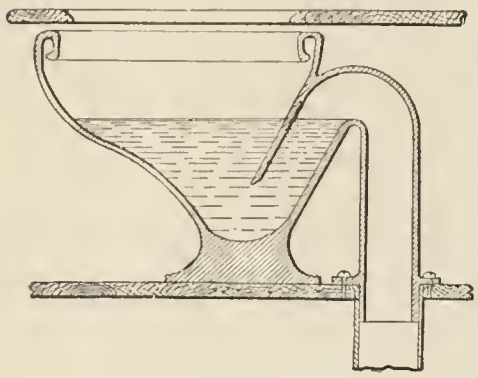
FIG. 2.—CONE OF POLLUTION.

from insects and reptiles falling into the well; hence the value of artesian wells where the water may flow for miles through the soil before coming to the surface.

R. C. KEDZIE.

THE CHICAGO MASTER PLUMBERS' ASSOCIATION.

THE NEED OF BETTER PLUMBERS.



WASH-OUT CLOSET.

At a regular meeting of the Master Plumbers' Association on the evening of April 5, a paper was read by Mr. J. J. Wade, in which he argued that plumbers could command the respect and confidence of the public by elevating themselves. Its significance, as coming from a plumber, warrants its reproduction. He said:

"Plumbing is a subject so broad in its range that I could take more time than I am willing to ask you to spend in listening. A quarter of a century ago, we find that the men then engaged in this business were held in high esteem. They escaped the jibes, the jeers and the sneers of the public. Laboring under many disadvantages, as compared with us, obliged to make their own lead material by hand, they were, through necessity, good mechanics. To become so they served a full term of apprenticeship; this required patience, hard work, aptitude for the business and a zeal to master all the details of a business chosen for a life-time. In a word, what they professed to do they were masters of—and masters of any trade command respect from all. This is the reason that plumbers of a quarter of a century ago were respected. Gradually since that time abuses have crept into our business, aided by the complications of advancing civilization, which has made greater demands on our intellect and thoroughness, and which, as a body, we have not supplied, till we have been looked upon by a large portion of the public as a necessary evil. These are not pleasant words for me to utter, but they are true. Who is there here to-night who has not been told by some one of his patrons during the year that his bill was an extortion, when he presented it for payment? Who can remember one man's telling him that he had called his neighbor's attention to a fine job of plumbing in his own house and had cheerfully paid a just bill? Not one, I venture to say; but all have received a growl, the supposed proper way in which to receive a plumber.

"The reason of this is found in a lack of thoroughness among men who have taken up the business while totally unfit to do so, because lacking the practical knowledge in the first place and being ready to jump into any other business the next year, if it holds out greater inducements. All this is the result of the disappearance, practically, of apprentices. Twenty-five years ago it was deemed absolutely necessary to serve an apprenticeship of five years to become a Master Plumber. To-day the only requisite is to have capital sufficient to open a shop and hire a few men. This is the class of men who have brought discredit upon us. The lack of apprentices who serve their full time—which should be not less than five years—has, and is now, working great injury to the plumbing interest, and I consider it our duty to do all in our power to remedy this evil. To do this successfully we must elevate the standard of our profession. I call it a profession, as it requires more to-day than a good mechanic to become a Master Plumber. More is required from us than merely laying pipes, according to specifications; more is required of us than to stop a leak in a pipe. Systems of drainage and sewerage unknown twenty-five years ago, have added complications which make a knowledge of ventilation necessary, requiring intelligence and study, just as the science of medicine does. The boys have caught the infection of the public and look upon our profession as lowering; the result is that when we get a bright boy we can not keep him at the trade. What destroys his interest in the business is that he is looked down upon for choosing such a profession as that of a plumber. He leaves the business and turns up behind the counter in a dry-goods store, parts his hair in the middle, wears good clothes all day, and degenerates into one of the thousand nonentities that eventually earn a salary of $15 a week, and pass through life an automaton. These influences we have to combat. I think it appropriate to say a few words here regarding our journeymen. Not only should we expect and demand the best work from them, but we should also look to their deportment, discouraging the use of profane language and indulgence in bad habits, as I believe that a good plumber must of necessity be a gentleman. The general health of the community is placed in our hands, and the community has a right to expect intelligent, trustworthy and conscientious men to look after the sanitary condition of their houses. Chicago is as free to-day from sewer-gas as any other city in the United States. So far, I believe, we have met all the complications in our system of sewerage which lies under a flat surface, and the grading thus limited. But let us not remain idle. Let us stand united and aid one another with counsel. This Association, which was formed about a year and a half ago, is, in membership, next to that of New York. It is the third organization formed by Master Plumbers in this country, and it owes its existence to the same necessity which gave birth to the associations of Brooklyn, New York, Washington, Baltimore, and other cities. The forming of associations bids fair to reach every city and village in the country. Since this association came into existence it has succeeded in weeding out abuses, and now demands protection in the plumbing trade. The plumbers of the Northwest are looking to us for advice, and the results of experience, as has been shown by the letters received; it becomes us so to conduct ourselves as to show a united front. This Association is the nucleus of a bond between the plumbers of the entire Northwest, and in a very short time I hope to see the plumbers of this entire country a unit, and our abuses obliterated."

THE COMING CONVENTION.

A letter was read from the Committee on Protection in reference to the convention of the plumbers of the United States, to be held in New York City about June 20. The corresponding secretary was directed to inquire what would be the basis of representation.

THE ASSOCIATION'S SEAL.

A design for a seal was submitted and adopted, as shown in the accompanying cut. It was explained by the Secretary as follows: "The central figure is a copy of an ancient statue in the British Museum—Hygeia. The rainbow indicates allegorically a promise of better work, and also, as after a summer shower, our surroundings are in a better sanitary condition, so by the efforts of the Association the sanitary condition of our homes will be improved. The top bar of tubes around which the banner is rolled is symbolical of, 'In union there is strength.'"

DEFECTS IN SOIL-PIPE EXTENSION.

The Sanitary Committee brought up the question of the material used for the ventilation of waste-pipes and soil-pipes of old houses, stating that in a great many instances tinned and galvanized sheet metal pipes were being used in extending the pipes up above the roof—used on the score of economy—and that the workmanship showed that those who did it had no knowledge of the end in view. In these cases, the Committee continued, the remedy will be as bad as the disease, as tin or galvanized sheet metal pipes are not durable, but corrode in a short time. The extension through and above the roof should be of the same size (if possible) and kind of material as the soil-pipe itself.

RECORD OF LABOR INTELLIGENCE.

The Committee on Labor Intelligence reported that THE SANITARY NEWS had kindly consented to take charge of a book, in which a record of those who want work and those who used employés is made, to be kept in its office and be always accessible, as well as to assist in securing such information as both might need.

THE COMING ENTERTAINMENT.

Sub-committees were appointed and other arrangements made for the entertainment which will take place on the evening of April 20, at Caledonian Hall, near the corner of Washington and Franklin streets. The entertainment will consist of recitations, vocal music, dancing and lunching. It was ordered that an invitation be sent to every Master Plumber in the city.

The meeting was presided over by President D. J. Rock, and the records kept by Secretary A. W. Murray, and was well attended.

THE SANITARY INSPECTION OF HOUSES IN CHICAGO.

Considerable interest is manifested in the work of the Tenement-House and Factory Inspection Service of this city, hence a statement of the scope of the work and the methods of performing it will be of interest. This is a sub-department of the Health Department, and is thus under the control of Health Commissioner DeWolf. It is under the immediate charge of Chief Inspector Genung, who is assisted by six inspectors. These inspectors are detailed to work in districts as follows: Central District, comprising the First ward, the central business portion of the city, Joseph Gruenhut; South District, all the remaining portion of the South Side, Leonard S. Hudson; Southwest District, all of the West Side west of the river and south of VanBuren street, Frank McCormick; West District, all west of the river and between VanBuren and Kinzie streets, Thomas Kavanaugh; Northwest District, all of the West Side north of Kinzie street, Alexander Monteith; North District, all of the North Side, J. McMahon. These men are required to report at the office every morning at 8:30 o'clock when they receive such special instructions as may be necessary. Complaints, many or few, of the unsanitary condition of the houses they occupy are made by tenants daily at the Health Department. After a record of these complaints has been made they are turned over to the inspector in whose district they fall, and he at once makes an examination of the premises. He goes to a house with police authority and authorized, if his suspicions of defective drainage seem to warrant it, to tear up floors or open partitions to get at the drains and pipes. If the premises are found deficient in plumbing, drainage, water-supply or ventilation, the landlord is at once notified in person and generally given five days in which to comply with the laws of the State, or the ordinances of the city, governing these matters. If he does not so comply, or show a willingness to do so, suit is at once commenced. The result is that the improvements, or repairs, which the law authorizes are always made. An interesting case is now in hand, illustrating the power of the Health Department in these matters. The tenants of a house complained of an inadequate water-supply. While some were drawing water from the pipes others could get none. It was found that the pipes were not of sufficient size; one result was that the water-closets on upper floors were not properly flushed, and were a constant nuisance. The landlord has been directed to abate the nuisance, which means, in this case, an increase in the capacity of the supply-pipes. Authority for this is found in that section of the Revised Ordinances which says: "Wherever any nuisance shall be found on any premises within the city, contrary to any ordinance, the Department of Health is hereby authorized, in their discretion, to cause the same summarily to be abated, in such manner as they may direct."

When all special cases are attended to the inspectors turn their attention to the tenement-houses and factories, which they visit and examine by streets. They proceed, whether any complaint has been made or not, to determine whether the premises are in a sanitary condition. Very full and complete reports are made of every examination, whether special, or in the regular course of the work, on blanks prepared for the purpose, and these are filed away at the office for future reference. The great amount of work done by this small force, and the almost incalculable good, are indicated in the number of places examined last year—almost twenty-five thousand. No less than 2,560 improvements were effected, and among these were the following, aside from such as would naturally be expected: Filthy premises cleaned, 247; new vaults and water-closets constructed, 26; houses lime-washed, 180; leaky roofs repaired, 20; machinery protected, 17; uninhabitable basements cleared of occupants, 22, etc.

THE NEW ORLEANS SEWERAGE.

To the Editor of the Sanitary News:—In complying with your request to supply your journal with some accounts of drainage and other sanitary matter, relating to New Orleans, I shall at present be able to do little more than show why the present system of drainage is retained in spite of all that has been said in favor of a different way of dealing with this vexing question.

The city stands on the east bank of the Mississippi river, 112 miles from its mouth, and is of an average width of two miles and about twelve miles long. The embankment that keeps the river in its course, called a levee, though ordinarily from three to ten feet high, does not, owing to filling that has been done, appear to be above the adjacent ground at the head of Canal street, the city's chief boulevard that begins at the river and extends back several miles in the direction of Lake Pontchartrain, separating the city, the upper portion being inhabited by English speaking Americans, and the lower half by French Creoles and their descendants, not to speak of others who are of European or Asiatic origin. Whatever may be the appearance, the river, when high, is several feet above the level of the city that stands on a plane slightly inclined toward the swamp in the rear. Thus it will be seen that without mechanical appliances the sewage can not be discharged into the river. Gas-works were erected in 1822 and used to some extent in 1824 to manufacture gas to light the streets, and ten years later, 1834, water-works were introduced to supply the city with water. Wherever the ground was opened to lay pipes water was found from two to four feet below the surface. Under such unfavorable conditions of soil, that exist at the present day, it was, and is now, impossible for the tax-payers to supply the pecuniary means necessary to construct a series of large underground sewer mains of masonry, such as are made use of in Boston and other large cities, to carry off the sewage and storm water. So New Orleans has never had a complete system of underground sewerage. It is true that in a few instances individuals or small corporations, as the St. Charles Hotel, have laid small iron pipes under the street pavement connecting with the river and by the aid of a steam engine discharged sewage into the river in that way; but the plan has never been put into operation in a large way by the city or any considerable number of individuals.

Two years ago a stock company was chartered here to place iron pipes underground in the streets, the pipes to be connected with the dwellings for the purpose of carrying sewage to the lower part of the city, there to be pumped into the river. Mr. Geo. E. Waring was the chief promoter, and somehow the company was unofficially called after his name, and the system, the same, nearly, that had been introduced at Memphis after the great epidemic, was called the Waring System of Sewerage. The most noticeable feature of the new plan was the surprisingly small size of pipes that would serve to remove the excreta and kitchen and chamber slops of a city of 222,000 inhabitants. The storm water was to run off by gutters and drainage canals, as provided for at present. It was proposed to purchase water enough from the Water-works Company to flush the pipes once in twenty-four hours, or more frequently, and thereby keep them "healthy." This continuous expense for water, added to the compulsory tax of the sewerage company, made the charge to individual house-owners come higher than they thought was just, and so they pretty generally opposed the scheme as that of a grasping monopoly. While every owner of improved property near whose buildings the sewer pipes passed was by law compelled to use and pay for the use of the pipes, the company was not required to lay its pipes in any street where the houses were fifty or more feet apart. This condition was, from obvious reasons, obnoxious to a large number of citizens. From one cause or another the new plan was attacked on all sides. The close-fisted and hard-hearted landlords, who would rather see their tenants perish than to expend a dollar in any sanitary work whatever, were bitter opponents. Dr. Brickell and some other vigorous writers attacked the scheme in the public prints, and predicted with startling earnestness the death and disaster that must befall the community if a stream of sewer-gas were turned into every house in the city.

It was thought by the projectors of the company that the flushing of the pipes would be quite sufficient to carry the diluted sewage to the lower limits of the city where, by enormously-powerful engines, it was to be pumped into the Mississippi. But this method was not at all clear to the subscribers. A Chicago civil engineer, who was here and examined the matter professionally, declared that the main pipe, or pipes, would have to be depressed gradually till at the lower end, or reservoir, they would have to be forty feet below the surface of the ground. This astonishing disclosure in connection with the growing disinclination of the people to pay any sort of tax "on compulsion," seems to have discouraged the leading spirits interested in introducing here underground sewerage, for the company slept on its rights till a few weeks ago when the City Council repealed the ordinance under which the exclusive rights were derived by the projectors and incorporators of the Waring company. Therefore we have now only surface drainage. In another letter I hope to tell how it is managed and explain how numerous evils have been corrected by the New Orleans Auxiliary Sanitary Association.

J. T. Payne, M. D.

New Orleans, March 27, 1883.

THE HOUSE INTERIOR.

SOME anxious inquiries for the "Art of the Nineteenth Century" have been recently made by writers on house decoration, and they have, as yet, made no very definite discoveries. It is so short a time since any considerations of art entered into the minds of makers and buyers of furniture or house fittings, that the best they could do was to turn back to the work of the French artists who flourished under the patronage of kings, and made for themselves world-wide reputations. Where this has failed them, they have reproduced classic forms, or the delicate grace and brilliant color of oriental work. But the conditions of the Nineteenth century, in these northern latitudes, are not those which produced the forms and fabrics appropriated by the workers of to-day. If we retain the classic dignity and simplicity, the Oriental lightness and brilliancy or the French luxury and elaborate decoration, they must be fitted to the necessities of time, people and climate, and so aid in the formation of a distinctive, consistent system which shall fulfill the requirements of to-day in regard to the beauty, suitability and healthfulness. The fashion of covering the walls of a room with heavy tapestries, is quite popular, and people adopt it without a thought as to its origin, or its present appropriateness. In mediæval times, when the vaulted halls and large rooms were very insufficiently heated, when the wind found many a crevice and, in many cases, the inner walls had no covering over the bare stone, a heavy hanging was a necessity on which both health and comfort depended, and, being a necessity, it was beautified with careful and elaborate decoration. But to cover the solid wall of a modern furnace-heated house in a dusty city with the same thick hanging, is simply an affectation, and an invitation to disease and dust to take up their permanent residence in the house. As a portiere a drapery has its uses, but as a wall-hanging in houses where the ventilation is imperfect, where rooms are small, or where there is a possibility of the poisonous presence of sewer-gas, it is fatally out of place. One might as appropriately masquerade through the mud of a Chicago street in the gorgeous court costume of the time of Louis XIV as to introduce into one's house the appointments of a feudal castle, unless they have something to recommend them beside a real or assumed antiquity.

* * *

WITH the inevitable spring cleaning the question of floor coverings comes again under discussion, and, to the dwellers in rented houses, where hardwood floors are not obtainable, it becomes a serious problem. Wool carpets, tacked closely down about the edges of the room and removed but once or twice a year, have come to be considered, not so much a necessity as a nuisance, and an offense against the laws of health and comfort. "What shall we substitute for them?" is a question that has been asked many times during the last month. The answer has already been given in these columns, but it will bear a repetition—hard floors where it is possible, and mattings where it is necessary to cover the floors. The seamless Lama mattings, which a year ago were new and expensive, are now sold for little more than the price of a common grade of the old-fashioned material. At the store of Marshall Field & Co., some of the spring importations are shown in all the popular colors. A plain old-gold matting, having almost the luster of a burnished surface, combines most effectively with the yellow tones so much in request at present for wall and furniture decoration. The plain reds are good in color and very serviceable, and less pronounced effects are found in the olive grounds brightened with touches of yellow, blue and red, and the natural grass colors with lines and broken checks of olive, red and green. These colors are almost fadeless, and the firmly-woven fabric is nearly as impervious to dust as a floor of hard wood. This material may be advantageously used for covering dado spaces, and, painted with a bold floral decoration, is very effective. Some curious novelties in inexpensive rugs are shown at the same store. They are made of the remnants and ravellings of carpets, woven after the fashion of rag carpets, and where the material used is Wilton, and the colors are well arranged, some very good effects are produced, which have almost the softness and harmony of oriental manufactures. They have the additional merit of being of Chicago manufacture, and are called Olsen rugs, taking the name of their maker.

* * *

THE present fashion for decoration in brass and bronze, while it is kept within the limits of beauty and fitness, brings forward some very good forms of ornamentation which are strong, graceful and genuine. But there are indications that this fashion is developing into a craze in which artistic consistency may be lost sight of. Fantastic shapes and inappropriate devices may have a passing popularity, but they are often uncouth and vulgar. William Morris' golden rule of decoration ought to be the motto of every purchaser: "Have nothing in your house that you do not know to be useful and believe to be beautiful." A table supported on crossed muskets or swords may be useful and effective as an article of camp furniture, or as a studio property, but there is no more reason for introducing it into a peaceable citizen's drawing-room, than there is for the use of an umbrella rack in the form of a horse's bit supported by whips, or a teapot in the form of a drum with sticks for handles, in other departments of his household A writer on this subject says: "All things of common use have their appropriate form, which, when once discovered, should be used and repeated without disguise. It can not be a very lasting pleasure to shake pepper out of an owl's head, or help yourself to butter out of a beehive; but it is a lasting pleasure to have a thoroughly useful and soundly-constructed thing made out of a right and good material, appearing in its appropriate place, and declaring and fulfilling its proper use and office."

* * *

AMONG the new designs and fancies for room decoration at the store of Spoor Mackey is a wall-paper, which is known as solid metal paper. The metal is pressed upon the surface of the paper and then stamped in a pattern which appears in slight relief. In tone it is a silver-gray with a touch of warmth and color, shading in some lights to a peach-blossom tint. It has an excellent metallic luster, the figures are clearly defined and finished, and it does not tarnish. The design is a pure French Renaissance, in conventionalized leaf and flower forms with scroll work. This paper which has the effect of a decoration applied directly to the walls is quite new and will be produced in all the metallic tints. At the same store are some panels intended for spaces above the doors for a new house in Springfield. They show painted designs on brocaded flock paper, the background in its velvet surface and raised design being very rich and effective. A panel for the hall is of terra cotta brocaded flock with a branch, green leaves and flowers shading from yellow to golden brown. One for a dining-room has a crimson ground with an apple branch covered with fruit, and another has a plum-tree branch with purple fruit, above which a bird is flying. The work is boldly done and is a very pleasing form of decoration.

* * *

IT is a hopeful sign for the future when, with the increase of wealth, the demand for genuine, honest, artistic work increases. Intelligent people have outgrown the chromo period and are no longer satisfied with the meretricious charms of sham ornamentation. The Veneering family, as Dickens portrayed them, still exist, but their pretensions deceive nobody but themselves. People of ample means have no excuse for tolerating unworthy imitations, and people who can not afford expensive, genuine things should not attempt to substitute cheap copies. The woman who buys a cotton imitation of a silk fabric, or flatters herself that her velveteen hangings will pass for "real velvet," gains neither the admiration of the friends whom she can not deceive, nor the satisfaction of having a durable, honest article. She can not enjoy it as it is, even if it prove serviceable, but must always try to see in it the beauty and richness of a fabric of many times its value. In the furnishing and enjoying of a home, especially to a person of moderate means, honesty is as cardinal a virtue as it is in trade or public life.

* * *

SEPARATE picture rods have not replaced mouldings which have the advantage of making every part of the wall space available for hanging pictures with only the trouble of changing the place of the hook. Many of the mouldings are wider than heretofore, some of them being six inches in width. They are usually of the same wood as the finishings of the room in which they are placed, but some show an effective combination of silver and fire bronze; others are of solid metal, while mahogany and ebony are suitable in almost any room. The newest fashion for hanging pictures is to place them flat against the wall. This necessitates hanging them a little lower than when they are inclined forward.

* * *

SIDEBOARDS and cabinets of oak or walnut with bronze panels bearing designs in relief are very solid and antique in appearance.

MARTHA HOWE-DAVIDSON.

CURRENT PUBLICATIONS.

CAMERON'S PLASTERER'S MANUAL.

A new and revised edition of this book has been published by William T. Comstock, of New York. It has new illustrations and additional recipes, etc., with an entirely new chapter on practical suggestions and precautions. The book contains accurate descriptions of the tools and materials used in plastering; a description of the appearance and action of the various limes and cements; instruction for making mortar and for doing all kinds of plastering, and cistern building, forms of contracts, useful tables and recipes, important suggestions and cautions. It is a valuable hand-book for plasterers.

BOOKS AND PAMPHLETS RECEIVED.

"Tenth Annual Report of the Secretary of the State Board of Health of the State of Michigan, for the Year Ending September, 1882." Lansing, Mich.: Dr. Henry B. Baker, secretary.

"Review of the Drug Trade of New York, for the Year 1882." Prepared by D. C. Robbins, Esq., for the Twenty-fifth Annual Report of the Chamber of Commerce of the State of New York.

"Cameron's Plasterer's Manual." Revised edition. By K. Cameron. New York: William T. Comstock, 6 Astor Place. Price, 75 cents.

"Communicable Diseases in Michigan during the year ending September 30, 1882, and Work of Boards of Health Restricting the Same." A report prepared in the office of the Secretary of the State Board of Health. Lansing, Mich.

"Sixth Annual Report of the Board of Health of the State of New Jersey, 1882." Ezra M. Hunt, M. D., Secretary.

NOTES AND NEWS.

ELECTRICTY AND ITS APPLICATIONS.

A new electric motor is attracting attention at Greenville, N. J., a suburb of New York. It was invented by Leo Daft, who has been experimenting with it for the past eight months, and who now claims that it works satisfactorily so far as power attained, simplicity of construction and cost are concerned. Mr. Daft claims that he can regain 75 per cent. of the energy exerted from the steam engine in running the dynamos, and that he can run the motors 40 per cent. cheaper than by steam.

The Edison Electric Illuminating Company has been organized at Boston with a capital of $1,000,000. Ex-Gov. Rice is president.

CONTRACTS AWARDED.

In the construction of its new water-works South Evanston has awarded the contract for dredging the infiltration-basin to Harry Fox & Co., for $950; for building the engine-house and tank to J. Davis, for $7,400; for furnishing pipe and laying it to M. Philbrin, for $6,906.53; for furnishing two steam boilers to the Chicago Steam-Boiler Works, for $1,287, and for the pump and engine to the Dean Pumping Works, for $2,025.

A. H. Andrews & Co., have been awarded the contract for supplying furniture to the public buildings at Albany, N. Y.

The contract for roofing the Cook County Jail and Criminal Court building will be awarded to Burke Bros,, for $500.

MISCELLANEOUS.

The issue in the village election at Evanston, to be held on April 17, is the proposed building of a ditch to drain the prairie west of the corporation limits. The estimated cost is $100,000. One objection to the improvement is that the stagnant water from the prairie will be discharged into the lake so near the water supply as to affect its purity.

E. S. Jenison, architect, has commenced suit against the Board of Trade of Chicago to recover $75,000 for professional services. Mr. Jenison competed for the position of architect of the new Board of Trade Building, and claims that his plans were once adopted. The plans finally selected were those of W. W. Boyington.

The Hinman Avenue Improvement Association at Evanston has issued a circular to property-owners in the village recommending that trees planted along the streets be limited to elm, rock maple, linden and white ash.

The trustees of the Dayton, Ohio, Board of Water-works will hereafter be appointed by the City Council. John W. Butt was accordingly elected a member of the Board at a recent meeting.

It is said that the Chicago Real Estate and Renting Association has the names of about five hundred "undesirable tenants" on its "black list."

If water-pipes are laid in the town of Lake View as fast as they are said to be needed, additional power will have to be provided soon at the Water-works.

The city of Winnipeg advertises for a City Engineer. Applicants must have had experience in sewerage and city works generally.

The city of Lansing, Mich., expended $30,987.96 during the year 1882 in street improvements.

A. C. Leary, an Evanston plumber, has been fined $10 and costs for plumbing without a license.

Messrs. Shields & Brown, manufacturers and sole proprietors of Bradley's Insulated Air Coverings for boilers, steam, gas, and water pipes, are about to remove to new and more commodious quarters at Nos. 78 and 80 Lake street, where they will be prepared to receive and execute promptly all orders entrusted to them. By reason of the adoption of entirely new and improved machinery in their manufactory, the quality of their goods will be much enhanced, being finished up in better style than heretofore. With the improvements that this enterprising firm have instituted, Bradley's Insulated Air Coverings will undoubtedly prove to be what their manufacturers confidently claim, viz: the best non-conducting, the most durable, the easiest applied, and the neatest coverings in the market. All architects, steam fitters and plumbers will find it advantageous to examine into the merits of their goods.

B. R. Hawley, manager of Hawley's Floor Warming and Ventilation, heating by Air Radiators, etc., has removed his office to room 11, Grannis Block, No. 115 Dearborn street.

Mr. P. J. Sexton has contracted for eighteen of Hawley's Patent Laundry Driers and Conveyers to be put in his flats at the corner of Chicago avenue and Cass street; also, Mr. Charles E. Hyde has contracted for five of the same to go into his flats at the corner of Jackson and Paulina streets.

BUILDING INTELLIGENCE.

CHICAGO.

The Board of Education of this city has awarded contracts for the construction of a school building at the corner of Wentworth avenue and Thirty-third street, to cost $44,000, exclusive of the heating apparatus. A committee has been authorized to advertise for proposals for erecting three new schools—the Keith school, at the corner of Dearborn and Thirty-third streets; the Wells, at the corner of Ashland avenue and Cornelia streets, and the Irving, on Lexington street, between Hoyne and Leavitt—and for the labor and material to complete the South Division High School.

A group of buildings will be erected on the lot 400x600 feet in size between Thirty-third and Thirty-fourth streets, and extending west from Dearborn street, to be devoted to the manual and technical training of children. When completed this will be one of the largest institutions of the kind in the world. One structure of the group has been commenced from plans by Burnham & Root. It will be constructed of Chicago pressed brick and brown stone, with carved panels and enriched moldings of terra cotta. The building will be finished entirely in hard wood.

Architect L. G. Hallberg has completed plans for a fine residence in pressed brick with stone and terra cotta trimmings for Robert Lindblom, at the corner of LaSalle avenue and Eugenie street. The cost will be $20,000. The design is modern gothic. From square bay-windows in the library and dining-room an excellent view is afforded of Lincoln Park. The parlor will be finished in cherry, and the dining-room will have a mahogany finish. The hall and library will be done in old oak.

Mr. C. P. Thomas, Architect, has completed plans for a block of stores and flats at the corner of North Clark and Chestnut streets, to cost $50,000. The elevation is in Indiana brick, and will be finished in brown-stone trimmings. Mr. Thomas has also begun plans for a building on North Clark street, near Division, for stores and flats, for H. Tifft, which will cost $45,000. St. Louis pressed brick and Connecticut brown stone will be used for the walls.

Architects Wheelock & Clay have designed a building to be erected at the northeast corner of Groveland Park avenue and Thirty-third streets, of black stone. It will cost $12,000.

A block of houses for Dr. E. S. Talbot on Goethe street, east of State street, the plans for which were prepared by Mr. Hallberg, are nearly completed. The material is green stone laid in rubble work with steps, porticos and trimmings of McArthur brown stone. The parlor will be finished in cherry, and the dining-room and hall will be in oak with mantels and flooring to correspond.

Mr. Wm. G. Hibbard, of the firm of Hibbard, Spencer, Bartlett & Co., will build a residence on Prairie avenue, near Sixteenth street, in the modern Queen Anne style. The width will be 30 feet and the depth 80 feet.

Mr. Hallberg has planned a house for Mr. J. H. Conrad to be built on Lake avenue near Fortieth street, to cost $12,000.

Architect Sierks has drawn plans for a block of six houses on Hoyne avenue near Lexington avenue for M. G. Reithel, to cost about $30,000.

H. H. Gardner, lumber merchant, will build a house to cost $20,000 from plans prepared by Messrs. Cobb & Frost.

GRAND RAPIDS, MICHIGAN.

The New Peninsula Club-house is to be built after designs of Mr. Gilbert, architect, New York City ; cost, $22,000.

Two three-story stores will be built on West Bridge street, owned by John DeLaney ; cost, $8,000.

Two stores will be erected at the corner of Fifth and Stocking streets, owned by J. Delameter ; cost, $6,000.

One two-story brick block will be built at the corner of Broadway and Leonard streets, Ald. Howard, owner ; cost, $4,000.

There will be built a wholesale business block at the corner of Island and Ionia streets, owner, W. J. Bulkley ; cost, $8,000.

Mr. John S. Farr is preparing to build a block of two stores on South Division street ; cost, $6,000.

A store building is now being erected on Stocking street, by H. Madden ; cost, $3,000.

The Union Benevolent Association propose to erect a substantial brick hospital on Bostwick street, to cost about $20,000.

R. B. Woodcock is preparing to build a fine residence at the corner of Cherry and Sheldon streets ; cost, $8,000.

C. S. Hazeltine has contracted the building of three residences, costing, $2,000 each.

L. E. Hawkins is making extensive repairs on his residence at a cost of $5,000.

William Solomon will remodel his residence at a cost of $3,000.

Mr. Z. Allen is building a large factory for the manufacture of his carpet-sweepers.

William Harrison has four new cottages about completed on the West Side ; cost, $1,500 each.

HYDE PARK.

A tract of thirteen acres in Hyde Park, between Forty-third and Forty-fifth streets and extending from Hyde Park avenue to the Lake, will be improved by building on it residences ranging in value from $5,000 to $10,000 each, and for the accommodation of the better salaried class. The buildings will all be constructed of pressed brick with terra cotta trimmings and stone approaches.

KALAMAZOO.

The Academy of Music, at Kalamazoo, Mich., completed last season, and owned by Bush & Paterson, of that place, is of rare architectural beauty. The interior decorations are unsurpassed for elegance o. design. Theatrical companies say there is nothing like it in the westf Mr. D. Adler, of Chicago, was the architect.

LAKE VIEW.

Mr. Meyer, of the Commercial National Bank, has commenced the erection of a fine residence on Barry avenue, Lake View, from plans prepared by Mr. E. Baumann.

BUILDING PERMITS.

The following is a list of new buildings in the cities indicated for which permits have been granted since the last issue of THE SANITARY NEWS, giving location, size, cost and name of owner ; all buildings are of brick unless otherwise specified :

CHICAGO.

Congress st and Wabash av., 6-story store, 80x171, $100,000 ; J. Q. Adams.
538 W. Van Buren st., 3-story dwelling, 25x69, $7.500 ; Mrs. C. H. Martens.
30 Samuel st., 2-story dwelling, 21x48, $3,000 ; John Kuhr.
527 and 529 S. Clark st., 3-story dwelling, 30x45, $3,500 ; C. E. Robinson.
187 Winchester st., 2-story dwelling, 23x50, $4,000 ; Mrs. Susan Fitz Hugh.
410 Canal st., 5-story warehouse, 64x90, $26,000 ; L. A. Slade.
3214 to 3218 Forest av., 3 2-story dwellings, 50x61, $6,000 ; C. R. Hickok.
73 and 75 Judd st., church, 20x50, $2,000 Cong. Ashe Russice.
1146 Millard av., 2-story dwelling, 20x40, $2,500 ; D. W. Small.
440 Thirty-first st., 2-story dwelling, 22x48, $3,400 ; P. Stanton.
Cass and Ontario sts., 2-story dwelling, 50x72, $50,000; Lambert Tree.
Cass and Ontario sts., rear, barn, 30x59, $6,000; Lambert Tree.
295 E. Huron st., 2-story dwelling, 40x46, $17,000; Gurdon Moore.
598 Throop st., 2-story dwelling, 21x58, $3,000; M. Melicha.
772 Eighteenth st., 2-story dwelling, 21x58, $3,000; John Vacholka.
Laflin and VanBuren sts., 5 3-story stores and dwellings, each 20x50, $15,000; H. S. McLean.
133 Augusta st., 2-story dwelling, 24x50, $4,000; John Falkenberg.
2409 Prairie av., 2-story dwelling, 23x60, $5,000; O. S. Sumner.
2569 Archer av., 2-story store and dwelling, 22x65, $5,600; K. Mueller.
46 to 50 N. Morgan st., 2-story addition, 50x100, $3,500; H. Beidler.
727 Webster av., 1-story addition, 73x45, $3,000; Louis Miller.
350 N. Paulina st., 2-story shop and dwelling, 24x86, $5,600; John Gals.
745 and 747 Indiana st., 3-story stores and flats, 50x60, $7,500; B. H. Hayes.
Lowe av. bet. Thirty and Thirty-first sts., 6 cottages, each 20x40, $6,000; T. H. Faile.
224 S. Lincoln st., 2-story dwelling, 22x50, $5,500; Streeter & Tucker.
1019 Twelfth st., 2-story dwelling, 25x60, $5,000; Louis Roeder.
3144 and 3146 Wabash av., 2 3-story dwellings, 50x74, $16,000; Alex. McIntosh.
105 Indiana st., 4-story store and dwelling, 25x70, $8,000; A. J. Lund.
Selden st., bet. Wood and Lincoln, 9 2-story dwellings, 167x40, $22,000; Noyes & Galpin,
653 and 655 Harrison st., 2-story dwelling, 22x60, $12,000; O'Connel & McGinness.
349 Division st., 3-story store and dwelling, 22x50, $5,500; A. Laufermann.
648 Dixon st., 1-story dwelling, 20x60, $2,500; M. Skewoski.
1617 Wabash av., 3-story front addition, 26x20, $2,000; C. L. Patterson.
526 Van Buren st., 3-story store and dwelling, 27x72, $10,000; Joe Roster.
187 Southport av., 2-story dwelling, 20x36, $2,000; Christian Boers.
98 Evergreen st., 2-story dwelling, 22x30, $2,500; August Krowitski.
115 W. Division st., 2-story flats, 21x44, $3,000; J. F. Morris.
336 N. Franklin st., 3-story flats, 22x50, $7,500; Louis Broberg.
172 Ontario st., 1-story dwelling, 22x50, $1,800; Wolf & Huxmann.
574 to 582 Congress st., 6 3-story dwellings, 100x54, $25,000; Reynolds Estate.
152 Lexington st., 2-story dwelling, 20x50, $2,600; Lena Flood.
14 Plum st., 2-story flats, 24x54, $2,500; D. A. Titcomb.
22 Grove st., 2-story dwelling, 21x84, $3,500; Theo. Bloun.
47 E. Chicago av , 3-story store and flats, 20x60, $7,500; A. O. Lindblad.
145 W. Lake, 2-story dwelling, 24x82, $2,800; F. T. Hemsen.
299 and 301 Michigan av., 2-story barn, 72x28, $7,000; E. J. Lehmann.
521 and 523 Blue Island av., 2-story store and dwelling, 24x70, $3,000; Wm. Krueger.
34 Lemoyne st., 2-story dwelling, 27x50, $5,000; Eli Thon.
316 Throop st., 2-story dwelling, 22x46, $3,500; Mrs. Mary Flynn.
862 Twenty-first st., 2-story dwelling, 21x67, $3,200; John Boek.
Thirty-ninth st. and Ashland av., 2-story dwelling, 23x86, $4,000; Peter Platt.
3841 and 3843 Wentworth st., 2 2-story flats, 44x40, $5,000; Gormann & Costello.
Central Park, near Ogden av., 2-story dwelling, 22x32, $3,000; J. Hunter.
171 and 173 Sedgwick st., 3-story flats, 49x88, $20,000; H. Rumsfeld.
Thirty-fourth and Iron sts., 2-story office, 26x46, $2,800 S. R. Howe & Co.
95 to 101 Fowler st., 2-story dwelling, 24x55, $10,000; Fred Grinnell and H. Drexelhaus.
1170 Western av., 2-story dwelling, 25x25, $1,500; Pat. Conlin.
3800 Dearborn st., 2-story dwelling, 20x50, $1,800; J. F. Abel.
1326 to 1330 W. Lake st., 3 2-story flats, 25x37, $9,000; J. M. Allen.
490 Belde av., 2-story dwelling, 40x52, $15,000; Mrs. Anna Halsted.
131 Michigan st., 4-story store, 20x100, $10,000; Chas. F. Grey.
499 Chicago av., 2-story dwelling, 21x50, $3,000; John M. Schroeder.
457 W. Superior st., 2-story dwelling, 22x52, $4,300; St. John's Church.
1616 Prairie av., 2-story dwelling, 24x80, $15,000; W. G. Hibbard.
368 Orchard st., 2-story dwelling, 22x33, $2,000; D. Schmidt.
200 W. Thirteenth st., 2-story dwelling, 22x53, $4,000; M. F. Peterson.
1282 N. Halsted st., 2-story dwelling, 22x50, $4,500; E. Madelers.
28 Osborn st., 2-story dwelling, 20x45, $1,800; Henry McGurren.
11 Osborn st., 2-story dwelling, 20x50, $2,100; Henry McGurren.

MILWAUKEE.

Aster st., First ward, brick dwelling, $5,000; F. Hintz.
Eighth st., Ninth ward, frame dwelling, $1,050; Ed. Smith.
Cherry st., Ninth ward, frame dwelling, $3,000; F. Zander.
Walnut st., Ninth ward, frame dwelling, $1,200; A. Lubenon.
Eleventh st., Tenth ward, frame dwelling, $1,200; Mrs. Grossmann.
Marshall st., First ward, brick barn, $1,500; Prof. Haskins.
Sherman st., Sixth ward, malt-house, $4,500; P. Altpeter.
Sixteenth st., Second ward, frame cottage, $855; G. Schaeffer.
Fourteenth st., Fourth ward, frame dwelling, $3,700; R. C. Reinertsen.
Walnut st., Tenth ward, frame cottage, $1,200; E. M. Schuengel.
West Water st., Fourth ward, frame addition, $2,200; M. Vogel.
Buffalo st., Third ward, frame addition, $200; D. Moran.
Third st., Sixth ward, frame store, $950; J. Schulhof.
Cedar st., Fourth ward, frame addition, $1,000; B. Balman.
Seventh st., Sixth ward, frame addition, $350; C. Dreineau.
Fourth st., Sixth ward, frame dwelling, $2,500; W. Benseman.
Fourteenth st., Second ward, frame dwelling, $1,700; Aug. Erdmann.
First st., Sixth ward, frame dwelling, $1,600; L. Heiser.
Eighth st., Second ward, brick dwelling, $2,400; A. Satran.
East Water st., First ward, brick dwelling, $1,500; J. Meritz.
Scott st., Eighth ward, basement, $500; W. Kopki.
Florida st., Fifth ward, frame dwelling, $800; J. Lutge.
Milwaukee st., Third ward, brick store, $1,600; Mrs. Follansbee.
Twelfth st., Tenth ward, frame dwelling, $1,000; L. Fels.
Fourth st., Second ward, brick store, $4,000; C. Abresch.
West Water st., Second ward, brick store, $2,500; J. Traudt.
Tenth st., Tenth ward, frame dwelling, $1,025; C. Patner.
Sherman st., Sixth ward, frame dwelling, $1,450; P. Casper.
Second st., Sixth ward, frame dwelling, $1,350; E. Thomas.
Washington st., Fifth ward, frame dwelling, $1,400; J. Bradshaw.
National av., Fifth st., frame dwelling, $500; Mr. Conrad.
Chestnut st., Second ward, frame dwelling, $1,800; O. Muller.
Vliet st., Ninth ward, frame dwelling, $500; M. Shole.
Third st., Thirteenth ward, frame cottage, $900; C. Otto.
State st., Second ward, stone basement, $300; Wm. Franzer.
Cold Spring av., Second ward, frame dwelling, $500; Geo. Ritter.
Twelfth st., Tenth ward, frame dwelling, $2,200; C. Gehar.
Fourteenth st., Second ward, frame store, $2,500; M. Kippenberg.
Fourteenth st., Tenth ward, frame dwelling, $1,100; Mrs. Dohn.
Harmon st., Tenth ward, two frame dwellings, $1,600; Zazieck & Shike.
River st., Seventh ward, office, $400; Felte & Meyer.
Fowler st., Fourth ward, trunk factory, $25,000; Abel & Fitzgerald.
Third st., Fourth ward, brick barn, $2,500; P. Cudahay.
Thirteenth st., Fourth ward, addition, $300; A. Clark.
Thirteenth st., Second ward, frame barn, $750; Wm. Powell.
Clybourn st., Fourth ward, frame dwelling, $2,250; M. Hayes.
Sherman st., Sixth ward, stone foundry, $3,400; Mayer & Co.
Twentieth st., Fourth ward, three frame dwellings, $4,800; C. Mayer.

NB 453